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ABSTRACT

The purposes of this conference were threefold: (1) to bring together a group of experts and representatives of selected Federal agencies to review the adequacy of training for teachers, professors, and administrators in the use of educational technology: (2) to seek recommendations from these experts as to the appropriate Federal and non-Federal roles in improving teacher training in the use of educational technology: and (3) to disseminate a report on the conference proceedings and recommendations to Federal and non-Federal groups concerned with the problems. During the first day of the conference, 12 persons nationally recognized in their fields presented a brief overview of particular issues related to teacher training in the use of educational technology. On the second day, the invited experts served as a panel which addressed the issue areas and, together with the conference participants, suggested recommendations for consideration by Federal agencies, state and local agencies, educational institutions, teacher organizations, students and parents, and producers and distributors of hardware and software. Included among the appendices are a list of the experts who presented papers and a list of the conference participants. (Author/LLS)

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FEDERAL INTERAGENCY COMMITTEE ON EDUCATION

Assistant Secretary for Education
Mary F. Berry, Chair

U S DEPARTMENT OF HEALTH, EDUCATION & WELFARE
NATIONAL INSTITUTE OF EDUCATION

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Proceedings of the
Conference on

Teacher Training In the Use of Educational Technology

held in Washington, D.C.
February 9 & 10, 1978

Sponsored by the
Subcommittee on Educational Technology

Robert Hilliard, Chair

July, 1978

U.S. Department of Health, Education, and Welfare
Office of the Assistant Secretary for Education
Washington, D.C.

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Foreword

These proceedings are the result of a working conference, Teacher Training in the Use of Educational Technology, held in Washington, D.C., February 9 and 10, 1978.

The Conference was planned and organized by the FICE Subcommittee on Education Technology chaired by Robert L. Hilliard. The conference coordinator and chairperson was Eileen T. McClay, Federal Trade Commission. William Oliveri provided FICE staff support. Funding for the Conference was provided by the National Institute of Education (NIE). Richard R. Otte, NIE, served as the project officer and on the planning committee for the Conference. Bert Cowlan served as Conference rapporteur and evaluator, and was responsible for the preparation of this report.

The purposes of the Conference were: (1) to bring together a group of experts to review with representatives of selected Federal agencies the status and potential of educational technology with particular emphasis on the adequacy of training for teachers, professors, and administrators in its use; (2) to seek recommendations from these experts as to the appropriate Federal and non-Federal roles in improving teacher training in the use of education technology; and (3) to disseminate a report on conference proceedings and recommendations to Federal and non-Federal groups concerned with the problems.

Twelve persons nationally recognized in their fields were invited to present, during the first day of the Conference, a brief overview of particular issues with respect to teacher training in the use of educational technology. Their presentations are included as part of these proceedings.

On the second day, the invited experts served as a panel which addressed the issue areas and, together with the Conference participants, suggested recommendations for consideration by Federal agencies, State and local agencies, educational institutions, teacher organizations, students and parents, and producers and distributors of hardware and software.

A summary of the issues covered and recommendations made are included in these proceedings.

Bernard Michael
Executive Director
Federal Interagency Committee on Education

Robert L. Hilliard
Chairperson
FICE Subcommittee on Educational Technology

Agenda

FEDERAL INTERAGENCY COMMITTEE ON EDUCATION
(FICE)

Subcommittee on Educational Technology
(SET)

Conference

on

Teacher Training in the Use of Educational Technology

Thursday, February 9, 10, 1978
Hubert H. Humphrey Building
200 Independence Ave, S.W.
Room 305-A - 339-A
Washington, D.C. 20202

February 9

9:00 A.M.	I.	Opening: Eileen McClay, FTC, Chairperson, FICE/SET Teacher Training Task Force and Conference Coordinator
	II.	Genesis of Conference: Robert Hilliard, FCC, Chairperson, FICE Subcommittee on Education Technology
	III.	The Federal Interagency Committee on Education (FICE): Bernard Michael, Executive Director
	IV.	Welcoming Statement: Peter D. Relic, Deputy Assistant Secretary for Education, DHEW
	V.	NIE Role: Patricia Graham, Director, National Institute of Education (NIE)
	VI.	Overview of Principal Issues: Ricahrd Otte, NIE, FICE/SET Teacher Training Task Force
9:45 A.M.	VII.	Procedure/Logistics of Conference: Eileen McClay
9:50 A.M.	VIII.	NCES/CPB Study of Use of TV in the Classroom, Ron Pedone, National Center for Education Statistics (NCES); Peter Dirr, Project Manager, Educational Activities, Corporation for Public Broadcasting
10:20 A.M.	IX.	Obstacles to Effective Use of Educational Technology: Bernarr Cooper, Chief, Bureau of Mass Communications, N.Y. State Education Department
10:50 A.M.	BREAK	

11:05 A.M. X. Discussion Area #1: Formal Preparation in Colleges and Universities: Charles Byrd, Director, Center for Instructional Technology, West Virginia State College, and Consultant, American Association of Colleges for Teacher Education

11:25 A.M. XI. Discussion Area #2: Certification Requirements for Teachers: Charles Byrd

11:50 A.M. XII. Discussion Area #3: In-service Training: Hyman H. Field, Director, External Learning Institute, Northern Virginia Community College

12:20 P.M. LUNCH

1:20 P.M. RECONVENE

1:25 P.M. XIII. Discussion Area #4. Teacher Organization Attitudes: National Education Association, James Davenport; American Federation of Teachers, Linda Chavez, Association for Educational Communications and Technology, Howard Hitchens

2:15 P.M. XIV. Discussion Area #5: Student/Parent Attitudes and Practices: Annette Exum, Council of Great City Schools

2:50 P.M. XV. Discussion Area #6: Administrator Attitudes and Practices: Martha Gable, Consultant, American Association of School Administrators

3:20 P.M. BREAK

3:30 P.M. XVI. Discussion Area #7: Special Need Users--Minorities, Women, Handicapped, Isolated: Linda Chavez, Editor, American Educator, AFT; David Warren, Director, Research and Cultural Studies Development, BIA; Frank Withrow, Director of Research, Bureau of the Handicapped, USOE

4:20 P.M. XVII. Discussion Area #8: Logistics and Content (hardware, compatibility, distribution systems, software): George Hall, Executive Director, Convocom; Lawrence P. Grayson, Chief, Technological Applications Division, NIE

4:50 P.M. XVIII. Adjournment

February 10

9:00 A.M. XIX. Opening

9:05 A.M. XX. Summary of First Day--Panel of Presentors; Robert Hilliard, Moderator

9:50 A.M. XXI. Recommendations: Robert Hilliard, Moderator; Panel and Participants

9:55 A.M. XXII. For Federal Agencies

10:25 A.M. XXIII. For Educational Institutions

10:50 A.M. BREAK

11:05 A.M. XXIV. For State and Local Agencies

11:35 A.M. XXV. For Teacher Organizations

12:05 P.M. XXVI. For Students/Parents

12:25 P.M. XXVII. For Special Needs

12:50 P.M. XXVIII. For Producers/Distributors--Hardware/Software

1:15 P.M. LUNCH

3:00 P.M. RECONVENE

3:05 P.M. XXIX. Summary of Recommendations: Conference Recorder Bert Cowlan, and Panel

4:40 P.M. XXX. Adjournment

Summary of Proceedings

Ms. McClay opened the conference by stating its purpose: "to provide a forum for discussion of the current situation in education technology and teacher training; to solicit recommendations for solutions to problems in the field; and to publish a report on the conference and its recommendations."

Dr. Hilliard explained that the genesis of this conference was an official meeting he had in Moscow several years ago with the deputy chief of the USSR's educational broadcasting system, a meeting which revealed a "Sputnik gap" in the area of educational broadcasting. The Soviet Union's problems were similar to those of the United States: lack of sufficient appropriations for optimum educational television implementation, and lack of training and motivation on the part of teachers and administrators. Soviet teacher training institutions, however, required that all students complete at least one full course in the use of technology in the classroom. A FICE/SET Task Force Study (see Appendix A) showed the teacher/administrator training/motivation problem to be significant, and recommended this conference as a first step toward rectifying what seems to be considerable inefficiency and waste in the use of existing hardware and software. It is hoped that conference recommendations will result in appropriate legislation and agency action.

Bernard Michael, Executive Director of the Federal Interagency Committee on Education described FICE: The Federal Interagency Committee on Education (FICE) was created by Executive Order in 1964 and operates under an updated mandate, Executive Order 11761, issued January 1974. Chaired by the Assistant Secretary for Education, FICE's functions are to improve coordination of the educational activities of Federal agencies; to identify the Nation's educational needs and goals; and to advise and make recommendations on educational policy to heads of Federal agencies; to the Secretary of Health, Education, and Welfare and through him to the President. Representatives from 34 FICE member agencies meet once a month to exchange information, resolve common problems, reinforce each other's activities, receive reports and recommendations of Subcommittees, and develop a coherent approach to Federal education programs. Subcommittees and other working groups are appointed as needed by the FICE Chairperson to focus on particular areas of interest and concern and provide reports and recommendations to the Committee. The FICE Subcommittee on Educational Technology, sponsoring this conference, has been one of the most active of these groups.

Peter D. Relic, Deputy Assistant Secretary for Education, Department of Health, Education, and Welfare, in welcoming the participants, noted that the teaching machine had been first heralded in 1918, but that teachers have been wary of its application. He suggested that all regions should attempt to develop a continuum of undergraduate through graduate in-service training in educational technology, being careful not to let its use widen the gap between the "haves" and the "have nots." He said that this conference was taking place at a propitious time, because of the urgent need to develop programs for the handicapped which can be enhanced by educational technology. He also noted the need to focus on education in non-traditional settings where educational technology can play a major role.

Patricia A. Graham, Director of the National Institute of Education (NIE), also welcoming the conference participants, cautioned that technology must serve an educational purpose; technology, of itself, does not always do so. Dr. Graham noted that NIE's mandate is to increase educational equity, to improve local educational practices. It is further charged with increasing student achievement, concentrating on secondary schools with particular attention to urban education, and examining the teaching process.

Richard B. Otte, Project Officer of the NIE, and member of the FICE/SET Teacher Training Task Force, suggested that the Conference explore the question of why, despite substantial Federal funding, educational technology is not making the massive impact that it was expected to make in improving American education. Dr. Otte commented that instructing teachers to use educational

technology is an area that has not been adequately addressed and is needed to achieve an integration of technology into modern education.

Ronald J. Pedone and Peter J. Dirr's paper, "Teacher Training in the Use of Instructional Television (ITV)," contained selected findings from a "School TV Utilization Study" conducted in 1977 by the Corporation for Public Broadcasting and the National Center for Education Statistics. The major findings of the study were that: (1) An estimated 727,000 teachers and elementary and secondary students regularly used television materials during the 1976-77 school year, (2) Seventy-eight percent of an estimated 2,275,000 teachers were reported to have instructional television programming available for use in the classroom, and (3) Seventeen percent of all teachers (2,275,000) were reported to have ITV training. The attitudes and reactions of teachers with ITV training showed: (1) Increased endorsement of ITV usage; (2) A more "committed" opinion about ITV; and (3) More current use of ITV, more time per week spent using ITV, and more time devoted to integrating ITV into classroom instruction.

The authors noted that although most educators recommend that teachers have training in the use of ITV and other media, only a small percent of K-12 teachers have such training. If ITV and other technologies are to become more valuable to and integral to the instructional process, teacher training programs must be expanded.

Bernarr Cooper, Chief, Bureau of Mass Communications, New York State Education Department, discussed "Obstacles to Effective Use of Technology." Dr. Cooper noted that the "gatekeepers" to the learning process have not been taught to use the technologies that could enrich the teaching/learning process. First and foremost are the classroom teachers. We need to devise new modes of education, both pre-service and in-service, for the teacher. Improvement in training must take place at three levels: in pre-service education, in fitting new programs into in-service education (which may require new kinds of institutions), and in the education of the teachers of teachers.

Charles Byrd, Director, Center for Instructional Technology, West Virginia State College, and Consultant, American Association of Colleges for Teacher Education, discussed "Two Problem Areas Associated with Teacher Training in the Use of Educational Technology." Dr. Byrd stated that: Instructional technology is more than a synonym for audio-visual education, but considers the unique characteristics of the teacher, the learner, the devices, the materials, the content, the learning arrangements and how these mediating factors may be interrelated to accomplish desired objectives. In regard to "formal preparation in colleges and universities, pre-service training must not only provide students with the latest equipment and materials but also the experiences in which they learn how to select, produce, utilize and evaluate a wide variety of materials. There is a need to modify and restructure traditional audio-visual classes as an integral part of the teaching/learning process. Infrequent use of instructional technology in pre-service education limits its use in the field of education. Teachers require "re-training" after leaving traditional college programs in order to effectively use instructional technology.

In discussing "certification and accreditation in instructional technology," Dr. Byrd noted that the dilemma for instructional technology is how much certification and/or accreditation there should be, by whom administered, and for what purposes. How far should state agencies go in setting standards for instructional technology? What should be the focus of the National Council for the Accreditation of Teacher Education (NCATE) and of the Association for Educational Communications and Technology (ACET)? More and more education agencies are recognizing the importance of instructional technology and are effecting changes in certification requirements which mandate provisions for training of teachers in the area through pre-service and in-service programs.

Hyman H. Field, Director, Extended Learning Institute, Northern Virginia Community College, discussed "teacher training in the use of educational technology." Dr. Field stated that in-service training for teachers in the uses of educational technology is badly needed. Very few teachers have had formal or even informal training in the area. The recent Corporation for Public Broadcasting study (Pedone/Dirr, see above) shows that only 17% of the teachers in the schools today have had training in educational technology. Yet, if educational technology is to be used well, it must - like other skills - be learned and practiced. However, in-service training in the area is not occurring today in the educational system for four reasons. (1) Other concerns, such as new methods of teaching mathematics and English or methods for dealing with handicapped students, have taken higher priority; (2) There is a failure on the part of teachers and administrators to realize that in-service training in the use of educational technology is necessary; (3) There is a hesitancy to re-define the role of the teacher from that of source of information to that of manager of instruction and, consequently, training in the new role is not done; (4) There is a lack of funding for significant projects to be developed in the area of in-service training in educational technology.

James Davenport, National Education Association, spoke on "teacher organization attitudes." Dr. Davenport stated that the attitude of the National Education Association (NEA) is reflected in policy statements which recognize the importance of the role which educational television now plays in the instructional programs of the nation's classrooms. He discussed the NEA's past support for satellite projects which included in-service education and classroom applications of TV. Teachers feel strongly that they need to be involved in the planning for new resources and do not resist technology if equipment and materials are readily available to them, if they can control the technology rather than being controlled by it. NEA believes that educational associations - NEA included - should re-examine their communications requirements to take advantage of rapidly advancing

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:echnologies, and that major steps towards the improvement of teaching practices would include the development of teacher-designed materials for teacher training in the use of educational technology. NEA would be pleased to cooperate in the development of such materials, but funding of such activities is basically a government function.

Linda Chavez, Editor of American Educator, spoke on "television and teachers: a new alliance." She said that television has been blamed for declines in student performances and other ills, but that television's influence can be highly positive and can have a great impact on learning. The American Federation of Teachers (AFT) is helping to bring television into the classroom. Teachers have a challenge to help students become less passive and more critical viewers, but teachers are not automatically equipped to perform this role. Teachers need advance information on upcoming commercial and public television programs to provide students with background materials and to prepare themselves to deal with the programs. The American Educator will shortly include a new section providing such information and guidance on its use. She stated that the training gap will have to be met in pre-service and in-service learning programs and should be mostly government financed.

Howard B. Hitchens, Executive Director of the Association for Educational Communications and Technology (AECT), discussed "teacher organization attitudes: AECT." Dr. Hitchens stated that the pervasive influence of modern communications media on society makes it impossible to ignore their potential for improving instruction of students in all educational settings. AECT has participated with other organizations and institutions to improve the training of teachers and to develop guidelines for the accreditation of teacher education under the general coordination and leadership of the National Council for the Accreditation of Teacher Education. There is teacher resistance to changing competencies in educational technology. We must use such technology as an integral part of a systematic approach to instruction and education. We must accept and encourage change. AECT, as a professional educational organization that advocates the growth of a comprehensive educational technology, stresses the need in American eduation for a carefully trained educational specialty in media and technology. AECT also advocates increased competence in media and technology on the part of all teachers at all levels of education.

Martha A. Gable, Consultant to the American Association of School Administrators (AASA), spoke on teacher training in the use of educational technology. She suggested that the term "teacher training" be more broadly interpreted as "educator training." Administrators as well as teachers must understand the impact of their decisions on the applications of technology to learning. Workshops and seminars for administrators and school and college board members are important. There must be continuity in training for teachers and administrators. In-service training should include learning the "art" of classroom utilization, as well as about hardware and software. The American Association of School Administrators favors liberalizing the Broadcast Facilities Act to permit school districts and educational institutions, as well as public stations, to seek funds for non-broadcast technologies, such as the Instructional Television Fixed Service, as well as broadcast equipment. Now is the time to focus national attention on educational technology with momentum generated by the re-writing of the Communications Act and the study of Carnegie Commission II.

David Warren, Director, Research and Cultural Studies Development Program, Bureau of Indian Affairs, discussed "teacher training in the use of educational technology: special user considerations - minority needs, including the American Indian community." Many of the comments based on Native American needs are also pertinent to the concerns of other minority groups. The Indian community has a unique opportunity to plan and control its own educational system. Educational technology must be utilized within a comprehensive system of education. Special concerns for cultural institutions, rapid population growth, local control in education, and other concerns of the Indian community, are critical to the effective use of educational technology. Better understanding of how learning occurs and how technology can improve that process in the special context of Indian education are particularly important needs where close cooperation among Federal agencies could yield beneficial results.

Frank B. Withrow, Special Assistant to the Deputy Commissioner, Bureau of Education for the Handicapped, U.S. Office of Education, discussed "staff development and educational technology." Dr. Withrow said that the changing character of American education includes both a movement back to basics and a differentiated curriculum which meets the appropriate needs of individual learners (including minorities, the handicapped, and the gifted). Meeting these trends cannot be accomplished without the adaptation and adoption of technology in the management of education and in applied learning technology. Past staff development has concentrated on traditional methods and purposes. To meet the new demands of society, the teacher (and learner) must become literate in the new technology. Staff development programs must embrace technology as a major tool so that those who learn through technology will be able to use it to guide the learning of their students. The Bureau of Education for the Handicapped is supporting several experimental programs where there is high use of technology, including teleconferencing. A combination of micro-computers videodiscs and other new techniques allows us the possibility of a new level of interactive and inquiry learning experiences that is affordable. Cost is not the critical factor. The key to whether these new tools will be used widely in the educational system of America is how well we will use them in staff development, in working with teachers so that they adapt and adopt technologies in their day-to-day management of the learning process.

Lawrence P. Grayson, Chief, Technological Applications Division, National Institute of Education, spoke on "logistics and content -

including hardware, compatibility, distribution systems and software." In using computers as an example that applies to other technologies, Dr. Grayson noted that millions of dollars and thousands of person-years of effort have been expended in trying to resolve educational problems through the use of computer technology. Despite these efforts, there has been little exchange of programs and little broad-scale impact. Possible solutions for encouraging the dissemination and exchange of computer programs for administrative functions include establishing a clearinghouse that could identify, solicit, test, maintain and market available software. He stated that teachers should learn to employ computer-oriented-instruction (CAI) and to integrate it into their ongoing instructional programs. Computer languages and equipment should be standardized. Course materials should become widely available.

Rapporteur's Analysis

"It has been said that from technological innovation to implementation takes seven years, except in education where it takes forty."

Source Unknown

"Alles hat sich verandert, nur nicht wie der Mensch denkt." (Everything has changed, except people's way of thinking.)

Albert Einstein

If there was a major common thread running through virtually all of the papers, it was this: instructional or educational technology must be planned with the teachers and the administrators and not for them. A second common thread concerned fears of teacher replacement by technology. A third dealt with the initial reason for the conference: the dismal state of training in technology at all levels of teacher training, both in-service and pre-service. Common to all concerns was the belief that the Federal government has a principal responsibility to do something about these issues, that appropriate actions require a level of funding which only the Federal government can assume.

The concept that educational opportunity and access to information on a life-long basis is a key to the survival of our society received strong support. Related to this were both explicit and implicit expressions of the changing nature of the American learner who is getting older, who is demanding education at the learner's location rather than in a "bricks-and-mortar" traditional setting, who is in increasing need of survival skills in a time of rapid societal change, and who is trapped (as are the schools themselves) by ever-rising costs of transportation and energy. The system is bursting at many seams and most participants felt that local-level application of adhesive tape was no longer, if indeed it ever was, sufficient to hold it together. As one speaker said, "We have had a revolution," and then went on to ask, "How do we use it?" The revolution is in the technology itself, in the potential offered learners, teachers, administrators, by the transistor (the electronics revolution) and the proliferating modalities (the communications revolution). The quotation above from "source unknown" was chosen to dramatize educators' fears and resistance. The quotation from Einstein was selected to dramatize our apparent inability to deal with revolutionary events.

Many at the conference implied that we are up against the schoolyard wall. "Outside" are the aging and minorities, the gifted and the poor, the lame and the deaf and the blind. All, in order to aid their own survival, are seeking tools to help in that process. "Inside," against the wall, is the educational establishment, confronted with the need to change and either resistant to it or too impoverished to do so. The conference participants were certain that educational technology is a major part of the answer. Virtually all were cognizant that, despite the enthusiasm for what technology can offer, we must not hesitate to ask, "If technology is the answer . . . what's the question?" To put communications technology in perspective, we now have machines that can read to the blind, screens that can present words to the deaf, equipment that can catch a program transmitted from a satellite 22,300 miles "up" and allow the user to play back what he or she needs at his/her own time and pace. Our public broadcasting system is about to implement the world's largest satellite interconnection of broadcast stations. Most participants agreed that the interactive capacity of this system should be exploited for optimum learning.

If recommendations are to be made for action at any government level, an examination must be made of resistance and fears which, it was suggested, are essentially psycho-social and cannot be legislated or mandated away. There are fears about the complexity and the costs of the equipment. Many administrators see the costs as draining dollars from other objectives. While it is true that the artifacts of educational technology are getting less costly, they are not necessarily getting less complex, either in terms of what they

can do or in terms of design. There is a hesitancy in being responsible for handling a new, costly, complex and powerful educational machine. Standardization might go a long way towards alleviating some of these fears. Standardization of not only technology, but courseware is also desired - and feared. The complexity of computer languages could be simplified through standardization of CAI and CMI (computer-managed-instruction) resources, yet many educators justifiably fear the loss of local control; a curriculum designed for California would not necessarily be appropriate for South Carolina or Massachusetts. This matter of irrelevance for local use has plagued many of the recent experiments in satellite media instruction. Teachers express the need for high quality materials, but also want a system which offers a large menu and is locally-controlled and user-driven. Teacher resistance to technology seems to soften as teacher control and involvement increases.

Accreditation was a major concern of the conference. If the educational system is to become increasingly technology-oriented or mediated, then the matter of who or what becomes the "gatekeeper" to the license to use the tools of the trade is an important issue. Yet, there was little unanimity as to who should make the ultimate judgment. There were also grave concerns about the blur between educational technology and educational methodology and whether they were conceptually separable or not. The technology was seen by some as a facilitator; others seemed to feel it had an inherent dynamic of its own.

There was concern that while encouraging teachers to "use the best," a definition of "best" is still to be determined; research is needed; training is needed; motivation is needed. The key is money. One estimate for effective nationwide teacher training in the use of technology was half a billion dollars. As essential as money is the need for a working partnership across all levels of government and all levels of education and educational management.

RECOMMENDATIONS

On the final afternoon of the conference, the group (presenters and participants) offered specific recommendations. In some cases this involved capsulizing suggestions already presented in the formal papers. About 50 recommendation were offered and reviewed. Proponents of the recommendations defended or opposed the suggestions; the group then voted to accept or reject. Some 27 separate recommendations survived this process. Some were redundant; therefore, fewer than 27 are listed here. Selected for inclusion in this report are those recommendations deemed to be of major importance and which fall under the purview of potential Federal government action.

The largest number of recommendations (26%) relate to research. These are, essentially, strategy items concerning educational technology's further uses, and the justification of new policies and funding. The second largest number (22%) deal with staff development. Predominant among these are recommendations for funding in-service training. Funds for pre-service training and "consciousness heightening" were also proposed. One recommendation on training suggests that whenever Federal funds are provided for technology proof must be offered that the recipients know how to use it or that training will be provided. The next group (15%) deals with future conferences and other dissemination activities. These stress the need to direct such activities to a broad spectrum: teachers, administrators, parents and students. Two recommendations suggest new Federal organizational structures. One urges establishment of a high level organizational unit on educational technology to be located within the Education Department. The second calls for a new independent structure for educational technology comparable to the Corporation for Public Broadcasting. Two recommendations deal with the need for satellite policies to keep open options for educational uses. There was at least one recommendation on each of the following: teacher organizations, certification, the Broadcast Facilities Act, standards, fees and copyright, and an omnibus call for the right of access.

I. General Recommendation: Access to Equal Educational Opportunities

Every citizen has a right of freedom of access to communication, information, and knowledge resources and must be provided an opportunity for competencies in print literacy, electronic literacy, computer literacy, and telecommunications literacy.

The Federal government should guarantee that all public educational institutions provide all potential learners with individualized educational programs through support of:

A. Research in the application of technology to facilitate learning;

B. Preparation of all levels of educational staffs to use technology to facilitate individual learning programs and needs;

C. Orientation of contracts and grants for educational technology to include all special need groups, such as minorities, women, handicapped, aged, gifted, economically disadvantaged, and others, based on a life-long learning concept;

D. Public education programs to make the public aware of the importance of technology in education;

E. Due process hearings for parents and students who are concerned about the adequacy of educational programs that do not use available technology for individual learning.

II. Research

A. Identify Federal agency programs related to the use of educational telecommunications;

B. Determine the most effective uses of educational telecommunications in formal

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and informal (including life-long learning) education in relation to:

1. Learning comprehension
2. Teaching styles and techniques
3. Administration;

C. Investigate the need for training and preparation of educational administrators and teachers in the uses and applications of educational technology. Such a study would include attention to special needs groups such as minorities, aged, handicapped and others. Such a study should also develop recommendations for Federal action and support.

III. Dissemination

A. FICE should develop and distribute a film and/or handbook on utilization of educational technology in the classroom;

B. FICE should sponsor a hands-on traveling workshop on the subject;

C. FICE should hold a follow-up conference, larger and more inclusive, with representatives from the educational establishment on all levels;

D. A seminar on educational technology applications should be held via satellite, linking some 10 to 20 points in the country and involving administrators, teachers, board members, parents, students, organizational representatives and others;

E. A series of regional meetings should be held on utilization and in-service education for all appropriate persons, following the format of the FICE/SET February 9-10, 1978 conference.

IV. Staff Development

A. Federal agencies should encourage State departments of education to require staff development programs in educational technology in conjunction with the preparation of program materials for use in the State;

B. Training should be provided for all teachers in higher education as well as on other levels, in the use of educational technology;

C. In-service training in educational technology utilization should be accorded a high priority;

D. Cooperative governmental programs (Federal, State and local) should develop a set of competencies in the use of educational technology.

V. Facilities: Hardware and Software

A. Any Federal grants for hardware or software should require that the funded source:

1. Include materials on how to effectively use hardware/software, and that a portion of the funds be allocated for such training materials;

2. Allocate a portion of the funds for in-service training, where appropriate, in the use of the hardware/software;

B. Current and continuing Federal grant programs, such as the Educational Broadcasting Facilities Program, should include provisions for funding instructional technology services such as ITFS, closed-circuit, cable and other non-broadcast facilities;

C. Federal grants should include standards for equipment, including compatibility requirements;

D. Federally funded program materials should include a guarantee for unlimited school-use rights.

VI. Satelllites

A. Federal policy should permit and encourage NASA to develop and operate satellites suitable to the needs of education and social service;

B. Dedicated space should be reserved for educational and social service use on all commercial satellites.

VII. Spectrum

Spectrum space currently reserved for educational uses, even if unused, should be protected from inroads by other services.

VIII. Certification

All organizations and offices concerned with teacher certification should be encouraged to review standards relative to professional education with a view toward requiring greater emphasis and at least mandatory minimum competency in the use of educational technology and telecommunications. This refers not only to operation of equipment, but also to utilization of learning materials.

IX. Teacher Organizations

A. An office, at least on the Bureau level, should be established in the proposed new Department of Education to administer legislated programs in the areas of education technology;

B. A national office or organization, comparable to the Corporation for Public Broadcasting, should be established with a commitment to the development and application of educational technology.

Conference Papers

Genesis of Conference

Robert L. Hilliard
Chairperson, Subcommittee on Educational Technology, FICE; Chief, Educational Broadcasting
Federal Communications Commission
Washington, D.C.

Not too many years ago the State Department asked me to meet in Moscow with Mr. Mikhail Monusov, deputy chief of educational broadcasting programs in the Soviet Union. We met at the USSR Radio and Television Ministry and for several hours Mr. Monusov and I exchanged the kind of information that we both could have read in official documents.

Realizing that the meeting was laboriously getting nowhere, I did what no traditional diplomat probably would have done: I admitted that our educational technology system had faults.

"Mr. Monusov," I said, "we have problems. First, Congress does not appropriate enough money to make educational television as effective as it could be, and second, most of our teachers and educational administrators are far behind the times and either do not use television well or do not use it at all."

Mr. Monusov straightened up with a huge smile and said: "Dr. Hilliard, you know, we have same problems. Soviet does not give us enough rubles and our teachers also are far behind times and do not use television as they should." Then, with a marvelous sense of humor that continued throughout our meeting, which from then on was open, relaxed and candid and lasted through most of the day, Mr. Monusov laughed and pounded the table dramatically: "But, you know, Dr. Hilliard, we have advantage over you. We can tell our teachers they must use it."

It turned out that they had other advantages too, not the least of which was the requirement that all graduates of teacher training institutions had to have completed at least one full course in the use of technology in the classroom. As Mr. Monusov described the training and, in effect, the certification requirements, and how they resulted in higher quality learning resources and opportunities, I realized that here, in the field of educational technology, was another Sputnik gap.

About two years ago I reported on this meeting to the Educational Technology Subcommittee of FICE. The Subcommittee undertook a study of the problem through a Task Force chaired by Eileen McClay, Federal Trade Commission. The Task Force started with the basic conclusions of the myriad of studies over the last few decades which have shown that effective use of educational technology, including television, does provide new and higher quality learning experiences for the student. This conference, therefore, is not going to reinvent the wheel by attempting to review what is now old, established ground. A number of reports from the Task Force confirmed the problem of teacher training as perhaps the most significant one, and pinpointed several specific areas of concern and possible solutions. The Subcommittee decided that if we were to achieve some educational consistency, no less fiscal efficiency, between the hundreds of millions of public and private dollars that have been spent on educational technology hardware and software, and the use made of these materials in both the formal and informal learning situation, something would have to be done to better motivate and train our teachers and administrators.

This conference is an initial step. It was originally planned as a small working meeting with a limited number of people. That it grew beyond our plan was due to the interest of many people who apparently see this problem as significant for education as we do. In addition to analyzing problem areas and seeking ways to solve them, including possible legislation and other federal action, this conference may lead to further, larger conferences, bringing together the public and private sectors for joint effort.

The FICE Educational Technology Subcommittee also will consider any new concerns that come out of this conference. In addition to offering you our appreciation for your interest and for being here, I ask and urge you to let us know of any problems or needs that you would like us to deal with.

For a long time now many people committed to educational technology use have considered many of their traditionalist teacher and administrator colleagues as conscientious, intelligent, hard-working people who are dedicated to making their schools the best educational institutions of the 19th century. Hopefully, this conference will help to correct both the perception . . . and the fact.

Overview and Principal Issues of the Conference

Richard B. Otte
Project Officer
National Institute of Education
Washington, D.C.

This conference explored the question of why educational technology has not had the massive impact that it was expected to make in improving American education. Millions of dollars have been expended over the past several decades to develop effective technological systems for the instruction, administration and management of education, but the broad scale impact of technology on our educational system that might be expected from such powerful educational tools has not occurred.

The general objective was to explore this problem, determine the basis for it, and come up with some policy recommendations to alleviate the difficulties that are hampering the integration of these powerful tools into our modern educational system.

In an attempt to achieve this objective, we employed the expertise of selected speakers and of our audience. During the first day, our speakers addressed some of the obstacles to the effective use of educational technology, the potentials of educational technology and the training of teachers to employ the available technology in their classrooms.

On the second day, the speakers assembled into a panel. Solutions and recommendations to the issues agreed on day one were presented and discussed with other panel members and with the audience. The purpose was to arrive at specific policy recommendations for agencies and institutions at the Federal, state and local levels.

This report of conference includes the policy recommendations that evolved. This report will be made broadly available to decision makers at all levels. It is our hope that this information will be informative, productive and useful at all decision making levels.

Over the past century, both knowledge and technology have been accelerating at an ever-increasing rate. This rate of acceleration in knowledge has now reached the point where it is impossible for any single person to be conversant with all of the information in a single field, such as medicine, engineering, law or construction. In the technology area, electronics alone has been subdivided into radio, television, motion pictures, audio recordings, digital computers, microprocessors, electronic calculators, telephones, teletypes, and communications satellites to name a few.

With this extensive array of electronic devices being adapted to the solution of educational problems, a new term, "educational technology," has evolved. This technology has been adapted to school instructional problems, administrative problems, and management problems.

While millions of dollars have been expended over the past several decades to develop effective technological systems for the instruction, administration, and management of education, the broad scale application of technology throughout our educational system that might have been expected from such powerful educational tools has not occurred.

Our general objective over the two days was to explore this problem, determine the basis for it, and hopefully, come up with some policy recommendations to alleviate the difficulties that are hampering the integration of these powerful tools into our modern educational system.

In an attempt to achieve this objective, the conference employed the expertise of selected speakers and of our audience. During the first day, selected speakers addressed some of the obstacles to effective use of educational technology, the potentials of educational technology, and the training of teachers to employ the available educational technology effectively in their classrooms.

Specifically, the following topical areas were addressed:

1. Pre-service training of teachers to use educational technology in colleges, universities, other teacher training institutions. What is done and what should be done?

2. In-service training of teachers -- What is being done and what should be done?

3. Are there and/or should there be educational technology certification requirements by the states?

4. What about the attitudes and practices of school administrators and supervisors toward educational technology? What are they? What should they be?

5. What about teacher organization attitudes? What are they? What should they be?

6. What about student and parent attitudes?

7. What are the attitudes and practices of users with special needs? What should they be?

8. What about the practices of manufacturers and systems developers? Are they helping or hindering?

On the second day, the speakers assembled into a panel. Solutions and recommendations to the issues raised on day one were presented and discussed with other panel members and with the audience. The purpose here is to arrive at specific policy recommendations for the following groups?

1. FEDERAL AGENCIES

2. TEACHER TRAINING INSTITUTIONS

3. STATE AND LOCAL EDUCATIONAL AGENCIES

4. TEACHER ORGANIZATIONS AND TEACHERS

5. ADMINISTRATION AND SUPERVISORS

6. STUDENTS AND PARENTS

7. MANUFACTURERS, DISTRIBUTORS AND SYSTEM DEVELOPERS

We appreciate your interest in this important problem area. Teaching teachers to use educational technology has been singled out by the FICE/SET as an area that has not been adequately addressed or handled. Consequently, we feel that lack of teacher training to use and integrate educational technology into ongoing classroom work is a deterrent to its broadspread integration into modern education.

Teacher Training in the Use of Instructional Television

Ronald J. Pedone
National Center for Education Statistics
Washington, D.C.
and
Peter J. Dirr
Corporation for Public Broadcasting
Washington, D.C.

On November 9, 1977, Marie D. Eldridge, Administrator, National Center for Education Statistics (NCES), and Henry Loomis, President, Corporation for Public Broadcasting (CPB), announced at a news briefing the results of the School TV Utilization Study which showed that an estimated 15 million elementary and secondary school students regularly received instruction from 727,000 teachers who used television as a teaching tool during the 1976-77 school year.

Other major findings included:

- 72% of an estimated 2,275,000 teachers reported instructional television (ITV) programming was available (either directly on-air or by videotape or film) for use with any of their classes.
- Of those teachers reporting the availability of ITV programming, public television was most often cited as the delivery method for televised programs (58%). Other systems were identified in the following order: cassette/film/videotape (37%); commercial television (26%); cable television (15%); closed circuit/master antenna system (12%); and Instructional Television Fixed Service (ITFS) (3%).
- In schools where television for instruction was available, approximately 97% (1.5 million) of the teachers were estimated to have access to television sets for classroom use.

Background of Study

The National Center and CPB, both having public interest responsibilities with respect to the educational impacts of instructional television, co-sponsored the School TV Utilization Study, which was designed to collect comprehensive data on the availability and utilization of instructional television in elementary and secondary schools. In addition, the study collected information on the attitudes and reactions of superintendents, principals and teachers towards the use of television for instruction.

After reviewing more than 15 statewide studies conducted by school systems, State departments of education and public television licensees, it became apparent to NCES and CPB that it was impossible to aggregate the findings in order to derive a nationwide perspective. Sporadic and partial studies took place over the past 25 years but none could provide comprehensive, accurate and timely national baseline data. A nationwide study had to be designed and implemented. The study, after two years of planning, designing, and testing, was implemented by CPB and endorsed by the American Association of School Administrators, Association for Educational Communications Technology, Council of Chief State School Officers, National Association of Elementary School Principals, National Association of Secondary School Principals, National Catholic Educational Association, National Education Association, and the Public Broadcasting Service.

Study Design

The study involved a stratified random sampling of all public school superintendents, principals and classroom teachers in all school districts in the United States with enrollments of 300 or more. It also involved a sample of elementary school teachers, principals and superintendents from Catholic dioceses (representing the private sector). Questionnaires were designed, field tested, modified, retested and sent to 933 superintendents, 1,850 principals, 3,700 classroom teachers. After three rounds of follow-up (which included a postcard reminder, mailgram and telephone call), the final response rates calculated for each group were: superintendents (96.4%); principals (89.1%); and teachers (85.2%).

Responses were carefully checked manually and by a computer editing process to guarantee accuracy of the data. Westat Research, Inc., assisted in this and the sampling phases of the project.

Although the data presented are based on samples, they are not likely to differ by more than a few percentage points from the results which would have been obtained from a complete canvass of

all public school districts, schools and teachers (in districts enrolling 300 or more students) and all Catholic dioceses, elementary schools and teachers. Specific measures of sampling reliability of the estimates will appear in forthcoming reports.

Preliminary Findings on Teacher Training

The preliminary findings discussed below will be straightforward, simple and restricted to only a few of the most salient aspects of teacher training and the use of ITV. (The study does, however, allow extensive and detailed analyses).

Before discussing some of these findings, the following should be noted:

1. Instructional Television (ITV) was defined as "any in-school uses of television (either broadcast or recorded) for instructional purposes."

2. The term "training" was not defined specifically. It may include a variety of activities with varying lengths of time, concentration and intensity.

ITV Training Among Teachers

All teachers were asked if they "ever had training on the use of a specific ITV series or on the use of ITV in general." Approximately 17% (390,000) of all teachers (2,275,000) reported that they had ITV training. Newly trained teachers (less than 1 year of teaching experience) were not more likely to have ITV training than teachers with many years of teaching experience (10 or more years) (Table 1). And yet--an estimated 72% of all teachers reported ITV programming was available, and 32% reported regular use of ITV series.

Table I: Teachers with ITV Training by Year's Teaching Experience, 1976-77 (asked of all teachers)

	Year's Teaching Experience				
	Less than 1	1-3	4-6	7-9	10 or more
	59,000	250,000	432,000	455,000	1,074,000
With ITV Training:					
	Less than 1	1-3	4-6	7-9	10 or more
	16.9%	14.0%	17.5%	11.4%	20.2%

For those teachers with ITV training, the type of training most often received was through college. More than half had received their ITV training within the last three years; less than one-fourth reported that training was required by State/local authorities and less than one-third reported that college credit had been earned for ITV training (Table II).

Table II: Profile of Teacher Training Activities, 1976-77 (asked only of teachers who reported ITV training)

	Teachers with training (390,000)
Types of training:	
College course work	42%
District in-service	38
Televised ITV in-service series	17
Workshop by local PTV station	11
State Dept. of Ed. in-service	6
Professional mtg. workshop	31
Percent completing training within past three years	58
Percent reporting training required by State/local authorities	23
Percent reporting college credit earned for ITV training	31

Attitudes and Reactions of Teachers with ITV Training

Respondents were asked to rate a list of uses of ITV as being important, unimportant, or neither. Comparing teachers with and without training, a distinct pattern seems to emerge. In nearly all of the potential uses of ITV, proportionately fewer teachers felt "neutral" towards the use of ITV (Table III). In many instances teachers with training seemed to increase their endorsement of ITV usage.

Table III: Importance of Uses of ITV, 1976-77 (asked of all teachers)

	Teachers with Training (390,000)	Teachers without Training (1,885,000)
a. To extend the range of experiences available to students.		
Important	78.6%	75.7%
Unimportant	2.3	2.2
Neither	19.0	22.0
b. To present new materials.		
Important	87.9%	74.5%
Unimportant	1.8	4.3
Neither	10.2	21.2
c. To provide different approaches to presenting material.		
Important	88.8%	82.2%
Unimportant	3.2	1.9
Neither	8.0	15.9

	Teachers with Training (390,000)	Teachers without Training (1,885,000)
d. To reinforce material taught in other lessons.		
Important	85.1%	70.0%
Unimportant	2.8	3.5
Neither	12.1	17.5
e. To bring new resources and/or persons into the classroom.		
Important	89.8%	80.6%
Unimportant	2.8	3.5
Neither	7.5	15.9
f. To motivate students' interest in a subject.		
Important	87.6%	76.9%
Unimportant	2.7	3.7
Neither	9.7	19.4
g. To lighten the teaching load.		
Important	31.4%	23.7%
Unimportant	42.3	39.5
Neither	26.2	36.8
h. To allow teacher to observe the students.		
Important	34.6%	34.2%
Unimportant	28.5	28.5
Neither	36.9	37.2
i. To allow teacher and/or students a brief time to relax.		
Important	26.1%	23.8%
Unimportant	42.7	42.2
Neither	31.2	33.9
j. To permit individualization of instruction.		
Important	45.4%	44.4%
Unimportant	18.6	17.7
Neither	36.0	37.9
k. To present subject matter where there is not special teacher.		
Important	52.2%	53.9%
Unimportant	15.0	14.7
Neither	32.8	31.3
l. To serve as suitable teaching alternative in emergencies.		
Important	32.8%	34.1%
Unimportant	34.2	31.1
Neither	33.0	35.8

The patterns also hold when analyzed on another series of questions that provide an overall picture of current attitudes towards selected aspects of ITV. Teachers with training are more likely to have a "committed" opinion about ITV than those without training (Table IV).

Table IV: Overall Reactions to ITV, 1976-77 (asked of all teachers)

	Teachers with Training (390,000)	Teachers without Training (1,885,000)
a. Shows great possibilities stimulating teacher creativity.		
Agree	61.7%	53.1%
Disagree	3.9	6.7
Neither	34.3	40.1
b. Teachers using ITV lose some of their importance in the classroom.		
Agree	7.5%	8.0%
Disagree	73.2	63.1
Neither	1943	28.9
c. Personal relationship between student and teacher is lost when ITV is used.		
Agree	12.3%	12.4%
Disagree	56.5	54.2
Neither	31.2	33.3
d. Development of more new ITV programs is a waste of time.		
Agree	1.9%	2.4%
Disagree	84.9	77.2
Neither	13.2	20.4
e. Teachers don't make enough use of ITV.		
Agree	53.7%	49.2%
Disagree	9.4	7.3
Neither	36.9	43.6
f. Use of ITV makes any subject more interesting.		
Agree	60.2%	50.3%
Disagree	9.1	10.8
Neither	30.7	38.8
g. ITV inspires students to greater curiosity and learning.		
Agree	62.2%	48.0%
Disagree	2.6	5.6
Neither	35.1	46.4

h. ITV is all right but I feel it has been overemphasized.

Agree	13.0%	12.2%
Disagree	50.8	38.1
Neither	36.3	49.7

i. Children watch enough TV at home; they don't need to watch more in school.

Agree	8.5%	9.9%
Disagree	58.6	51.5
Neither	32.8	38.5

The influence of ITV training may be that it heightens awareness of and commitment to a specific ITV activity or position. Teacher attitudes may crystallize - either positively or negatively - after or during training rather than remain indifferent or neutral. New or added information gained from the training may tend to promote distinct positive or negative attitudes.

Use and Integration of ITV by Teachers with ITV Training

Teachers were asked to indicate whether they used any ITV series during the 1976-77 school year regardless of whether series was on-air, on film or videotaped. Clearly, proportionately more of the teachers with ITV training than those without were more current users of ITV (Table V). They also spent more time per week using ITV (Table VI), and devoted more time integrating or including ITV in their classroom instruction (Table VII).

Table V: Use of ITV, 1976-77 (asked only of teachers who have ITV programming and sets available)

	Teachers with Training (335,400)	Teachers without Training (1,248,000)
In past week	38.9%	25.2%
In past month (but not week)	15.8	12.1
In past year (but not month)	21.8	21.8
Not in past year (but sometime)	13.1	20.7
Never	10.4	20.1

Table VI: Average Time Used per Week, 1976-77 (asked only of teachers who used ITV in past week, month or year)

	Teachers with Training (256,600)	Teachers without Training (737,600)
None	5.1%	5.2%
Less than 1 hour	27.8	38.1
1 hour or more	67.1	56.7

Table VII: Time spent before and after discussing or preparing for ITV Series Used, 1976-77 (asked only of ITV series users)

Before			After	
Teachers with Training (737,600)	Teachers without Training (256,600)		Teachers with Training (737,600)	Teachers without Training (256,600)
20.2%	15.3%	None	5.0%	2.9%
53.0	52.0	10 min. or less	43.8	32.8
26.8	32.6	More than 10 min.	41.3	64.4

Implications

It is premature, with only preliminary analyses completed, to suggest any but the most general implications from these findings. Further analyses will undoubtedly shed more light on the relationship of teacher training and attitudes toward and utilization of instructional television. However, some patterns have emerged. Teachers trained in the use of ITV are more likely than those not trained to have a concrete opinion on the potential uses of instructional television. The data also show that the use made of ITV is higher among teachers with training than among teachers without training.

Although ITV programming is available in 72% of all the classrooms in this country and is used regularly by 32% of all the teachers, this study found that only 17% of all the nation's elementary and secondary school teachers have been trained in the use of ITV. If the use of ITV and other related technologies is to increase and become more valuable and integral to the instructional process, teacher training programs must expand.

Further Analyses

Detailed analyses of the School TV Utilization Study data base will continue during 1978. Findings will be released in a series of publications from CPB and NCES. Upon completion of those reports, the data will be made available to other serious researchers who might wish to pursue some questions further.

For the first time in the history of the use of television in school, a comprehensive data base exists which describes the status of instructional television. The data base allows us to move beyond the arena of "educated guesses." Perhaps information from this survey will serve as the initial step in the development of a comprehensive data system to assist in the planning, development, and implementation of television and related technologies for instructional purposes.

Obstacles to Effective Use of Educational Technology

Bernarr Cooper
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New York State Education Department
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My remarks concern themselves with the obstacles and not the technologies, themselves. It may very well be that one of our more pedantic colleagues is likely to ask, "But what exactly IS educational technology?" At this point in time, we must content ourselves with the comment made by one of the more cogent philosophers of our time, the late Louis Satchmo Armstrong. When asked by a society dowager of some fame and fortune to define "Jazz," Satchmo replied, "Lady, if you gotta ask what it is, I don't think I'd mess with it." One thing is certain -- our educators, our school districts, our institutions of higher learning, and all of our centers for adult learning and lifelong education must "mess" with it over the long term, and be intimately involved in its use and availability. Assuredly, if we continue to be an educational house divided against itself on the matter of educational technology, its uses and the development of its materials -- then I say to you that we will continue to render all learners intellectually sterile. Thus our society can only emerge as one in which the individual will exist as a mental midget and without the ability to live a full life and achieve parity with his fellow man in the human marketplace.

It would not be possible to address the entire laundry list of apparent and not so obvious obstacles to the use of educational technology in our society. Certainly we can examine, briefly, some of the obstacles which are more overt, and let us examine those in light of some of the technologies which are more pervasive.

A recent study by the Corporation for Public Broadcasting quotes a parallel study which reports that 35.2 percent of all students in this country view instruction through television at least once a week. This means that somewhere around 15,400,000 students use at least one of the technologies at least once a week! This same report by the Corporation for Public Broadcasting also indicates that more than 726,000 teachers are involved in the use of that same instructional television -- and this is only one of the technologies!

This information must boggle the mind and must lead to the inevitable question, "Why are we then concerned about the obstacles to the use of technology?" The response to that question must be, "Because we still find vast segments of our population unable to read or understand the simplest of documents, from the labels on food products and drug store items to the basic and simple instructions for the use and storage of simple equipment in the home. In addition, we find that large sections of our population are unemployed -- or worse -- unemployable because they lack the reading ability to upgrade themselves in a variety of training programs supplied at no cost by various local governments and educational institutions with federal funding support."

The tragedy is not that the technology and some of the software to "feed" it does not exist. The tragedy appears to be that often the "gatekeepers" to the learning process have, themselves, never learned to use or been taught to use the technologies that could so enrich that learning process.

The gatekeepers include first and foremost the classroom teacher. It is a well-known axiom, corroborated by the Panel on Educational Research and Development that teachers tend to teach as they are taught. Teachers tend to learn by first hand observation, literally by doing. And if the mode of instruction to which they are accustomed has ignored or only used minimally instructional technology and its materials, then the teacher will do likewise. The teacher in training is most often taught by those who themselves received no instruction which included the use of educational technology materials. The problem then becomes one of devising new modes of education both pre-service and in-service for the teacher.

But devising such new modes is not enough; we must also devise rapid ways to disseminate such new ideas and training. Therefore, improvement in training must take place at three levels: in the pre-service education of teachers by fitting new programs into existing educational schemes; in the in-service education of teachers which will require the development of not only new kinds of programs

but even new kinds of institutions to offer such programs for in-service purposes.

We know that many of the present methods of in-service education are not working. The busy teacher, required to make several daily preparations, has neither the time nor the energy to add a needed and often time-and-energy-taxing in-service requirement to the daily regimen, which he or she often finds taxing beyond physical endurance. Continuously harried to be more productive, to carry greater class loads, to perform a myriad of clerical and bookkeeping tasks which do not relate directly to the teaching/learning process itself, the teacher rebels against added in-service workshops, which are frequently unrewarding, poorly organized, or worse, a recital of printed facts that could be better absorbed if made available at the convenience of the teacher.

In many school systems and districts, where new subjects and ideas are frequently mandated without adequate formative testing and evaluative techniques that can determine the best possible approaches for the student, the experienced teacher has long since become disillusioned by the promise of golden learning opportunities for the student, which never emerge. Can we forget the empty promise of the new world of understanding built around the need for the new math? Can we forget the rush to inculcate a host of instructors and educational administrators with the need to face the real world, for students to meet the challenge of all things mathematical with the new comprehensions? And as we look around now to that call to "return to basics," we must once more face up to the fact that we have several generations that have never been taught the pleasures of arithmetic -- let alone the need for readin' and writin' -- those two quaint and old-fashioned skills basic to every aspect of communications -- including the use of almost every technology.

We have only begun the laundry list of the interceptors -- the obstacles, if you will -- to the use of technology for learning and teaching needs. It would not be difficult to list in rapid succession; the administrator, the parent, the recalcitrant board (either of education, or the board of trustees of the institution of higher learning), the operator of the dissemination system -- whether it be the owner and manager of a cable television system, or the engineer-manager of the local school distribution system, or the head of the nearest radio and TV station. All of these manager types frequently refuse to make the system available at the convenience of the learner and user. And what about the president of the film producing company who has the answer to an educational need and will brook no interference from any educator? Then, there is the federally appointed member of the advisory council on learning need who has come in with the new administration, displacing the man or woman from the old administration who had just begun to get a handle on things.

Let us look at the member of the local, regional or state service organization who has discovered a need - has also recognized the solution to that need - the creation of a piece of software - a book, a film, a set of slides, a radio or TV program which could be "so effective" - "something," we are told, "like the materials created for SESAME STREET -- and why couldn't they be managed so that everyone could have them at a cost of no more than $2.98?" Have we forgotten to include the national organization created on the basis of a long term study, funded by millions of taxpayer dollars that was to concern itself with one of the public technologies except that the public is never contacted for an expression of need, while the self-stroking minor officials remain uncontactable, unaware, undesirous of truly observing the condition of human need for the fruits of the governed technology?

At this point you might very well say, "Well, he hasn't left out anything or anybody." My response to that conjecture is contained in the words of that famous citizen of the Okefenokee Swamps, Pogo, who said, "We have met the enemy, and he is <u>us</u>!"

But let me assure you, the list of obstacles has only begun. For surely, we, the practitioners and fringe-hangers-on -- must know that as we have sown -- so shall we reap!

Who among us has not at one time or another, for one reason or another -- I repeat -- who among us has not made the claim that the use of technology will solve every problem of learning and teaching? Some twenty-five years ago, an overzealous, uninformed administrator claimed that one or another of the technologies could replace the teacher - the director of learnings. Ten years ago the claim was repeated. Five years ago a series of packaged instruction making the same claim was produced. Always the claims were loudly heralded. Always the results were minimal and were resounding in their failure to eliminate the classroom director of learning - the instructor.

I suggested earlier that if we are to encourage the use of the technologies, training for teachers must take place at three levels. We have already looked at the needs for two of these: pre-service training and in-service training. The third level at which we must affect improvement is in the education of the teachers of teachers. In this category we must include both professsors of education and master-teachers whose concern is practice-teaching programs. How does one influence the retraining of the professor of education or the master teacher who is using the tried and true method that has worked so well for twenty or twenty-five years? What does one say or do to the distinguished faculty member of the college of education who became that on his retirement after thirty years as a superintendent of schools? And who hadn't been in a classroom all that time -- let alone taught any of the young learners?

It would be all too easy to simply give a nod of recognition to those institutions and those dedicated instructors who did use the new technologies to train teachers, who did inculcate a real enthusiasm for both the hardware and software of the new media. But in giving the nod and saluting the dedication of these pioneers we must also recognize their product -- the new teacher who, fired with enthusiasm, comes to his first job,

looks for the support that has always been philosophically promised to the dedicated teacher, only to be told that he or she had better forget about the new technologies "because we are having a difficult time with zero growth budgets" or because, quote, "there is a real challenge in having to make do. Anyone can teach when they have all that technological help. It is the dedicated teacher who can take fiscal restrictions in stride and rise above the petty necessity of equipment and software." Unquote. How long, we must ask, how long will the learner be victimized by the administrative rip-off that forever dooms the student of any age to minimal learning with minimal materials and minimal effort?

We must come full circle in our inquiries and finally ask, "What does it take - what are the conditions which one must bring about to make possible a journey through the world of concepts and ideas? How may we arrive at the end of that journey with the certain thought that there is reason and continuity in the process of lifelong learning? How may we make certain that reality and hope resides in the learning process, and that it is a process always available to the learner wherever he may be, and whenever he wishes to learn? And, finally, under what conditions may we assure the learner that he can indeed travel and arrive at his destination in an enlightened condition?"

But we must travel and we will travel. And the condition of that journey will be up to us to mutually determine as we set about the task of considering the technological advantages available to us all.

The Problem Areas Associated with Teacher Training in the Use of Educational Technology

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The President's Commission on Instructional Technology has defined instructional technology as:

> a systematic way of designing, carrying out, and evaluating the total process of learning and teaching in terms of specific objectives, based on research in human learning and communication, and employing a combination of human and non-human resources to bring about more effective instruction.

The foregoing definition, it will be noted, is a "process" definition. It does not equate technology with equipment and materials - hardware and software. Emphasis is upon the "systematic" treatment of the many variables in an instructional situation and the provision of the proper "mix" which will maximize the effects of teaching. Instructional technology is more than a synonym for audiovisual education. Rather, it considers the unique characteristics of the teacher, the learner, the devices, the materials, the content, and the learning arrangement and how these "mediating factors" may be interrelated to accomplish desired objectives.

Problem Area I:
Formal Preparation in Colleges and Universities

In order to assess the value of instructional technology in teacher education, there must be a systematic means of evaluating the impact of each of the mediating factors in the solution of an instructional problem. It does not suffice to dwell on the advantages of using movies, overhead projectors, tape recorders, or filmstrips anymore than to devote extensive time to discussion of the characteristics of a good teacher if such is done in isolation from the problems of learning which a teacher faces.

Particularly true in regard to the use of media is the ancient cliche "teachers teach as they themselves are taught." If teachers are to make effective use of instructional technology, teacher education programs must make provisions for pre-service teachers not only to have available a variety of the latest equipment and materials, but also to have experiences in which they are called upon to make decisions as to the best materials, equipment, and learning arrangements for bringing about desired responses by the learner. Teachers must be taught how to select, produce, and utilize a wide variety of materials; how to employ a variety of techniques and approaches; and how to evaluate the results of their efforts. They must learn how to make instructional decisions based on consideration of the many human and non-human factors impinging upon the instructional situation. Traditional, "non-mediated" training programs cannot be expected to produce "mediated teachers." From a review of present offerings in pre-service programs, it should be evident also that preparation of teachers for effective utilization of instructional technology requires modification of traditional audiovisual courses which stress "how to operate hardware and make overhead transparencies."

In some institutions the teacher education program requires only one three-hour "basic a/v course." However, there has never been agreement among "media people" as to what constitutes a "basic course." In most cases the course has consisted of a general overview of audiovisual fundamentals, instruction in operation of so-called basic equipment, and what might be called the "specialty area" of the instructor teaching a given class. For example, if making overhead transparencies is the instructor's strong point, the class is usually saturated with instruction on the use of overhead projection. If, on the other hand, the instructor is a "shutter-bug," then the class gets heavy emphasis on 35mm slides, photographs, and perhaps mounting techniques. Moreover, the former industrial arts teacher-turned a/v specialist may be inclined to emphasize models, dioramas, or graphics. In each instance, however, there is likely to be emphasis on production methods and techniques with final evaluation based on the quality of the finished product. Little or no consideration is given to the unique characteristics of the product in the teaching/learning

process or to the contributions of instructional technology to learning. Indeed, some teacher education programs merely allocate a small block of time within a general or special methods course for a unit or two on media. As a consequence, there is a tendency to consider media as an embellishment or supplement rather than as an integral part of the teaching/learning process. The technology of instruction is likely by-passed under the so-called "press" of the professional education requirements for certification.

In view of the relatively infrequent use of instructional media in pre-service teacher education, it is understandable that technology has not found its way into the field of education to the extent that it has in industry, commerce, and the military. It is interesting to note that fifty years ago, industry invested about 75% of its capital in buildings and about 25% in tools. At that time, education was doing the same thing. Today, however, industry, in order to realize greater output per worker through technology, invests the major portion of its capital in tools and technology and a relatively minor portion in buildings. Education, however, continues to put most of its capital dollars into bricks, and mortar, usually leaving inadequate funds with which to purchase the "tools" of teaching.

Many colleges and universities have been developing materials centers with facilities for preparing a variety of graphic materials such as overhead transparencies, slides, photographs, and charts. On some campuses, moreover, there are facilities for producing and/or reproducing both video and audio recordings. Likewise, some institutions have installed facilities for high-speed duplicating at low cost. Despite the increasing availability of these tools of instructional technology, many teacher-trainees find themselves lectured to or required to spend a major segment of the class period copying copious material from a chalkboard, or even listening to the professor or a fellow student read from a textbook. Many trainees get their major exposure to media use in the schools where they do their student teaching. Thus it becomes necessary to "re-train" teachers when they leave the traditional teaching of the college classroom before they can confidently take their places in the world of instructional technology.

Problem Area II:

Certification and Accreditation in Instructional Technology

At the outset, consideration of the subjects of certification and accreditation requires a clear understanding of both the meaning of the terms and the nature of their application. In the field of education, accreditation indicates that a "program," a "group of programs," or an "institution" meets specified standards which have been set forth by agencies or organizations responsible for establishing evaluative criteria. Certification, on the other hand, denotes that an "individual" has met prescribed standards set forth by the certifying agency or organization. In both cases there are numerous agencies which seek to exercise control and establish standards. These agencies may be classified as: governmental (e.g., state departments of education), professional societies (e.g., American Chemical Society), regional organizations (e.g., North Central Association of Schools and Colleges), or national groups (e.g., NCATE).

The question of certification in instructional technology requires that a distinction be made as to who is being certified. Consideration must be given to the difference that exists between the classroom teacher with some general skills in instructional technology (e.g., "media endorsement" on the teaching license) and the instructional technologist with expertise and special training to function in support of teachers (e.g., the district or building specialist). While each of the aforementioned licensing bodies provides minimum criteria for application to both situations, there are considerable differences among their views of the nature of those criteria.

The response most readily given to the question of why certification and accreditation are important is quality control. It is argued that the public needs assurance that qualified persons are performing the tasks needed and that certain minimum production standards are being met. Of equal importance in many cases, however, are identity and prestige. Every profession, every discipline, and even many academic areas seek to be identified as something separate and apart - something different. To require that practitioners meet specifications is to give those practitioners separate identity. When an institution, organization, agency, or individual can boast of having met required standards, then prestige is gained among peers and others within the same or associated fields.

Another prime force affecting accreditation and certification is that of public mandate as manifested through state laws. Every state has laws requiring licensing of certain professions and the institutions which train the persons to fill the positions in those professions. The teaching profession is one such profession so affected. Every state requires its teachers to have a license or certificate of one type or other. State departments of education also concern themselves with accreditation of the institutions under their supervision which are engaged in training teachers.

The dilemma for instructional technology, then, is how much accreditation and/or certification there should be, by whom it should be administered, and for what purpose. Also of consequence is how far state agencies will go in setting standards for instructional technology. What, for example, should be the focus of NCATE viz-a-viz teacher education and media: the classroom teacher-user, the school building or district level professional assisting the teacher, or perhaps both? What role should AECT play?

It was only a few years ago that the media specialist was rarely known by those in the teaching profession. There were a few projectors around, and some teaching materials - most teacher-

made - could be found. Thanks to the fortitude of a small cadre of persons who were convinced that "audiovisual aids" could improve teaching, instructional technology has now been brought into focus. As a result, there is a tremendous need for persons with know-how to incorporate this new technology properly into the entire field of education.

The picture is not as bleak as it may appear, however. Certification of media specialists is of concern to a majority of the states. More and more state education agencies are recognizing the importance of instructional technology and are effecting changes in certification requirements which mandate provision for training of teachers in this area - through pre-service and in-service programs. The recent action of NCATE in making AECT an associate member indicates recognition of the importance of instructional technology in teacher education programs. The conference being held here is a prime example of the federal government's concern in this important area.

Formal Preparation in Universities and Colleges and Certification/Accreditation in Relation to Instructional Technology are but two of the problem areas to be examined at this conference. To offer solutions at this point might suggest that "the answers are already in." Were this so, there would be little need for this conference. Instead, papers could be presented and solutions to these two and the remaining six problem areas could be gleaned from the reading thereof. It should not be anticipated, either, that solutions will be forthcoming by the time the conference adjourns. Rather, this gathering provides a forum for "getting the issues on the table," for putting them in proper perspective, for exploring possible alternatives, and for deciding which directions are best to go in search of final answers relating to problem areas in instructional technology in teacher education.

In-Service Training

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In-service training of teachers in the use of educational technology is an area that is often simply overlooked. However, I don't think the importance of this type of training can be overemphasized for two major reasons: First, only a few of the teachers now in the schools have had any substantive training in the utilization of television or any other forms of educational technology as a part of their formal education. Many of our teachers who are now in the schools either began teaching before courses in the use of educational technology were a part of the college curriculum or took these courses a number of years ago before some of the latest thoughts and advances in the field were incorporated into the curriculum. Others graduated from schools where courses in the uses of educational technology either were nonexistent or were given only a very brief treatment in the curriculum.

Secondly, the use of educational technology is a skill and, if educational technology is to be properly done, it is a rather high level skill. Like all skills, it's one that must be learned and must be practiced.

I think it is also safe to say that currently there is very little in-service training in the use of educational technology taking place. The recent Corporation for Public Broadcasting study shows that only 17% of the teachers in the schools have training in the area. What is occuring most often consists of a half day or a one day workshop, and these vary greatly in terms of quality. I have seen instances of workshops which consisted primarily of training in hardware related items such as how to arrange the seating for students in the classroom and how to turn on a television set. I have also seen those which were quite good and did include some of the theory of instructional design and some practice in dealing with students on an individual basis.

I understand my primary function this morning is to try to present what I feel are some of the major problems behind this inactivity or lack of in-service training of teachers in educational technology. I might add that I do have some suggestions for possible solutions to some of these problems.

One of the first problems that comes to mind in this area is that in-service training of teachers in the area of using educational technology just has not received a very high priority. If we take a look at what's happening in education in general today, one can very quickly see that there are a number of areas where in-service training for teachers is necessary. Not too long ago it was learning to teach new math and learning new methods of teaching reading. Today you will find a great emphasis on in-service training for teachers in dealing with the handicapped in response to the new legislation that requires that the handicapped students be put into the most productive environment. I doubt, however, that the use of educational technology is given a very large role in these workshops. These areas have just simply taken precedence over in-service training in use of educational technology. Couple this with the limited amount of time when teachers are available to engage in in-service training (time often limited by contract) and it is quite obvious that in-service training in the use of educational technology just often does not occur.

In this same problem area of receiving low priority, I think the instructional material which utilizes educational technology has often itself received low priority and, consequently, this priority transfer to the in-service training side. Take instructional television for instance. In the past this has been predominantly enrichment material. Very few of the basic skills have been taught by using educational television. PBS, for instance, while doing many outstanding things in cultural affairs and public affairs, has never given high priority to instructional material. Many of the other agencies which do deal directly with instructional material have put much of their effort into the production of material that is enrichment rather than instruction in basic skills. I think this will be changing, but up until now, you could count on one hand the number of series which dealt with basic instruction.

Also, ITV has most often received low priority or in some cases been a second-class citizen at the public broadcasting stations. Often the ITV staff at a station is a skeleton staff with a producer, perhaps, and a manager but very few staff to deal with in-service training of teachers and administrators. Similarly, while the public broadcasting stations may schedule instructional programs during an entire school day from 8:00 in the morning through 3:00 or 3:30 in the afternoon, it is extremely difficult to get time in the later afternoon and particularly in the evening for the broadcast of instructional material. Consequently, using the television medium as a part of an in-service training program has never been feasible. I don't know of one instance where instructional programs for use by students or in-service training of teachers has been broadcast by a public broadcasting station in the evening hours when teachers are at home and have the time to sit down and participate in this kind of activity. Also, the broadcast of instructional material outside of school hours so that teachers might preview it just has never occurred. This kind of previewing of material is, in itself, an important type of in-service training. Teachers often don't really know what this form of educational technology consists of and, consequently, they hesitate to use it in their classrooms. These teachers who have used instructional television in the classroom have often done so without ever really knowing what is going to appear on the screen when they turn the set on. Yet, we expect them to follow-up this material and use it in an academically sound manner. Those teachers who are not using the televised material never get a chance to preview it because it is being broadcast only during the time when they are teaching.

A second problem in in-service training of teachers in use of education technology is a failure on the part of many teachers and administrators alike to even realize that this kind of training is required. Too many feel that mediated instruction be it by television, radio, cassettes, programmed textbooks or whatever, doesn't require the teacher to participate. They think that one turns the TV on, and if one can do that, then the machine does the rest. Well, as I have suggested earlier, this simply is not the case. Teachers must prepare the students to use the material. Teachers must be prepared to take up where the mediated material leaves off. They must be prepared to help those students who are having particular problems. They must also be willing to deal very creatively with students who become motivated by some particular piece of instruction and lead these students to more in-depth study of a particular area or to some other type of activity. Primarily, they must be enthusiastic about their use of the material, understand its potential and limitations and be able to convey their enthusiasm to their students, and to use the material in such a manner that best suits the needs of their students.

This leads to what I feel is the third problem in the in-service training area of educational technology, and this problem is the hesitancy to re-define the role of the teacher. Teachers still are most often looked upon by themselves and by administrators as conveyors of information. They are the source of knowledge and the final authority in subject areas. In most uses of educational technology, this simply is no longer the case. In the new learning environment created by the use of educational technology, teachers can, I think, best be described as managers of instruction. They are the ones who lead the students to the proper material, and who, perhaps for the first time in their careers, have time available to deal with a class of twenty-five or thirty students as individuals.

Another aspect of this redefined role is that more and more teachers can and should become involved in the creative process of developing mediated instructional material. And here let me again state that by mediated materials I include everything from print to slide/tape material, audio cassettes, radio, television, and computer based instruction. Teachers can now work with their colleagues and with specialists in the area of educational technology to develop material which is much more thoroughly and carefully planned and designed and much more comprehensive than anything they could have ever hoped to have when they had to make entire presentations by themselves day in and day out. This new role for teachers, however, is not understood by many administrators and by many teachers and teachers organizations and, consequently, strikes fear into the hearts of many. There is still concern that educational technology in the form of mediated materials is going to take jobs or relegate teachers to a secondary role. In fact, just the opposite happens. It frees the teacher from the repetitious presentation of factual material and allows them to deal with individual students in terms of the student's capabilities, interests, and full potential. When this new role is fully recognized and carefully defined, then in-service training can occur toward proficiency in this role. It will become evident that teachers need the training, and the purpose and type of the training will be directed by the role definition.

The fourth and last problem I want to mention this morning in relation to in-service training in educational technology is the lack of any large scale projects, or even for the potential funding of such projects, to develop in-service training in uses of educational technology. The little that has been done to date has been done pretty much on a shoestring. To my knowledge, there have been no significant projects which have been primarily devoted to in-service training in use of educational technology. However, I have just recently learned of one such project which is now in the early stages of development which will use approximately six half-hour mediated lessons for exactly this purpose. I don't believe this project has yet been fully funded, but I sincerely hope that the developers are successful in finding the kind of money that will be required to do this kind of job effectively. The funding need not be on a scale with Sesame Street, but it should be sufficient to bring together top minds in the field to develop a course of study which is academically sound, and to produce very high quality learning materials. I would estimate that such a project would require at least two hundred and fifty thousand dollars. That

figures to a little under fifteen hundred dollars per finished minute of instruction. But when you look at that figure in terms of the potential impact it will have on education and the number of teachers it will serve, and if you compare it with the amount of money put into public affairs, cultural affairs, and general entertainment programs on television, that's quite inexpensive.

These, of course, are not all the problems that effect in-service training but they are four which I think are perhaps most pressing and deserve some careful consideration and, hopefully, some resolution. One example may help illustrate the urgency I feel. A large, national production agency is presently developing a major project to use media to teach basic skills in the public schools. Their original design was for the material to be interactive -- the students and teachers would become actively involved in the instructional process and use the mediated material in different manners as best fit their particular situations. When the agency took this design to various areas of the country and met with teachers and administrators, they found that the teachers did not know how to use such material nor were the mechanisms available whereby they could learn. Consequently, an innovative, creative approach to mediated instruction had to be redesigned until it fit the existing and less threatening mold.

Teacher Organization Attitudes: National Education Association

James M. Davenport
In Behalf of John Ryor, President
National Education Association
Washington, D.C.

Preamble

> "The agencies responsible for the education of children and youth have a public charge and responsibility to introduce and to experiment with new developments, techniques, and resources in order to find the most effective approaches to providing a quality education for students at all levels. Within this context, instructional television should be recognized as an integral part of the total educational program and should merit the serious consideration and cooperation of educators in all areas of the instructional program."

These are not the words of the Ford Foundation, which has invested millions in the development of educational television. Neither are they the words of the National Association of Educational Broadcasters whom you might expect would be interested in promoting the use of television in the nation's schools. Nor are they the words of a vested interest group such as commercial equipment manufacturers or distributors who stand to profit from the sales of television cameras and receivers. Then, whose words are these? These words are taken from the first paragraph of the Preamble of the official policy statement of the National Education Association on the Professional Rights and Responsibilities of Television Teachers and constitute the NEA's official pronouncement, adopted by the Board of Directors and the Delegate Assembly, as to the importance and role which educational television now plays in the instructional programs of the nation's classrooms. The above NEA pronouncement on behalf of our 2 million members applies equally to the broad range of educational technology as it does to educational television.

NEA's Track Record in Educational Technology

As many of you in this assemblage know, the NEA has had a distinguished track record in the field of educational technology during the past quarter century.

In the 1950's, NEA was a founding member of JCET and took a leading role in protecting the reservation of TV channels for education. In the 1960's, it played a prominent role in the expansion and utilization of Instructional Television Fixed Service (ITFS), a multiple channel microwave service for schools primarily in urban areas. During this period, NEA conducted the survey and study which led to the establishment of a telecommunications system for the territory of Guam. At the request of UNESCO, NEA conducted an educational needs study for Alaska with implications for satellite communications to meet some of the crucial needs of Alaska natives. It organized CINE, the Council on International Non-Theatrical Events, which has had phenomenal success in processing outstanding non-theatrical films to represent the U.S. in overseas festivals. And finally, in the 60's, it formed PUBLI-CABLE, a consortium of national organizations and individuals to protect the public interest in the development of cable television.

For the past six years the NEA has pioneered the use of satellite communications in its own program to communicate with its members in areas far removed from Washington -- particularly in Alaska and Hawaii, and more recently in Appalachia. It has used satellite technology to provide in-service education opportunities for teachers in remote rural areas with programs built around needs which members have identified as important to them. In doing this, NEA has experimented with the use of satellite communications as a vehicle for the delivery of NEA programs in lieu of transporting members to Washington or to some other central location for training purposes. Two satellite experiments were particularly noteworthy: (1) The Pan-Pacific Satellite Project -- designed to provide two-way communication via satellite radio between teachers at 12 South Pacific, 6 Alaskan and 6 Appalachian sites; and (2) APPALASKA INTERCOM, a satellite television experiment for teachers in Appalachia and Alaska. Four satellites were interconnected by NASA, PSSC and Appalachia Educa-

tional Satellite Project for this experiment. All of these experiments were conducted by NEA at its own expense from teacher member dues, without a federal or foundation grant! This should be sufficient evidence of NEA's interest in and commitment to the use of educational technology!

NEA has also had a long-time commitment to public broadcasting and has been heavily involved in the activities of the Corporation for Public Broadcasting. Its representative served as chairman of one of the four Task Forces which authored the Education Study for ACNO, served as an officer of ACNO, and currently serves on CPB's 24-member Public Participation Task Force. NEA is a member of the Public Services Satellite Consortium and its representative serves on PSSC's Board of Directors.

NEA governance has solidly supported these involvements in educational technology and telecommunications through the years. There are few, if any, other national educational organizations or associations that can boast a better track record in the telecommunications area than NEA.

Teachers' Attitudes Toward Technology in the Classroom

A few comments on the teacher's attitude toward educational technology are in order at this point. The job of today's teacher has become almost unmanageable. The self-contained teacher and the self-contained classroom and self-contained school are obsolete. No single individual has the energy, competence and time to deal effectively with all the responsibilities assigned to one teacher in today's schools. It has been our experience that teachers welcome, therefore, all the resources that can be made available to them to assist them in their enormous job. Contrary to popular mythology, teachers do not fear technology as replacements to them. What they do resist and resent is the planning for them and not with them that so often accompanies technology's introduction and implementation. How can teachers fear being replaced by technology, when in many high schools there is only one TV set for 80 to 100 teachers? How can they fear a film projector that is more likely than not out of repair? How can they be expected to use programs which are irrelevant or unavailable at the time the teacher needs them most? The rigidity of most school programs mitigate against effective use of technology in the classroom setting.

Despite all of these obstacles, teachers are, in fact, using technology in the classroom. The Corporation for Public Broadcasting's recent School Television Utilization Study revealed that 727,000 teachers used television as a teaching tool during the 1976-77 school year. The study showed that classroom teachers view television as a positive teaching resource. Fifty percent of those responding to the survey expressed positive attitudes toward televised instruction, while 10% expressed negative attitudes and 40% had no opinion. This is proof enough that teachers do not resist technology if equipment and materials are readily available and accessible to them at the time they have need for it and when they can control the technology rather than being controlled by it.

One other important item of information needs to be mentioned in this connection. In the final evaluation of NEA's APPALASKA INTERCOM satellite television experiment last year, teachers in Appalachia and in Alaska who participated in the experiment were asked to give their overall evaluation of the seminars in terms of the information gained from them, compared to other NEA-sponsored conferences and training activities in which they had participated.

The results showed the following:

38% felt they received more information from the satellite activity than from other NEA-sponsored activities;

44% felt they had received about the same amount of information that they received when they attended other NEA activities;

18% felt they learned less from the satellite activity than from other NEA activities.

The participants were also asked to compare the satellite experience with face-to-face meetings with a live instructor.

Of the 328 respondents,

57% felt the satellite program was better than having a live instructor on site;

19% felt the satellite program and a live instructor would be about the same;

23% felt a live instructor would be better than the satellite.

Judged in the light of the above statistics, 82 percent of the participants felt they learned as much or more from the satellite activity than from other activities, and 76 percent felt that the satellite seminars would be as good as or better than face-to-face meetings with a live instructor.

These data would indicate that the NEA should give serious consideration to extending this type of activity in the future as part of its training and information programs for teachers nationwide. In fact, the data would indicate that such activity would be virtually mandatory in view of the mounting cost of travel and subsistence required to bring teacher leaders across the country to meetings.

In Conclusion

Communications is fast becoming the key word in association management -- in NEA as elsewhere in the business and professional communities. Many association executives are taking a hard look at how new developments in communications technology will affect the way they communicate with their members in the future. It behooves educational associations -- NEA included -- to re-examine its communciations requirements in light of rapidly advancing technologies in the videocassette and videodisc fields, and to take advantage of the new satellite interconnection system and services which

will soon be available through the Corporation for Public Broadcasting.

Our association strongly supports technological developments in education but it wants these developments to be carefully planned -- not haphazard or whimsical -- and it wants to play a major role in the planning.

One small step for "our" kind, but a giant step toward improvement of teaching practices, would be the development of materials for teacher training in the use of educational technology. NEA would be pleased to cooperate in the development of such materials because we believe the materials should be teacher designed. Also, we are organized strategically to improve their utilization. However, we cannot fund their development and distribution with our limited resources, nor do we think we should since it is basically a governmental function.

Due to declining enrollments the focus of Teacher Training has to be in-service. There will be few "new" teachers. Therefore, materials for in-service training of teachers in educational technology is basic to any advancement in utilization.

Television and Teachers: A New Alliance

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I feel a bit today like an English teacher who has shown up the first day of the school year to find that all my students are expecting to learn Latin. A few of the same principles may apply to the teaching of both, but I'm not sure I've got the right words. I'm about as comfortable with words like hardware and software as I am with aleatoric. I think I know what they mean, but are they adjectives or nouns?

I am here to speak on only one of the aspects of teacher training and educational technologies: training teachers to use television in the classroom. I am by no means an expert on the subject. However, we at the American Federation of Teachers have begun what we hope will be a successful venture in helping teachers adopt commercial and public television to educational use.

Television has been blamed for a decline in student test scores, an increase in juvenile violence, the corruption of our young people's morals, and just about every other social evil that could beset the youth of our nation. Why then is an organization which represents nearly half a million educators interested in helping its members bring television into the classroom? It is precisely because television exerts so pervasive an influence on students' lives that we feel we must begin helping teachers shape that influence into a more positive one and that is not a task which many teachers are presently equipped to undertake.

For many teachers, television is the enemy. It keeps their students from completing homework assignments. It teaches their students that "ain't" and "they wuz" and "them guys" are perfectly acceptable figures of speech. It gives them role models that are crude, inarticulate, and physically abusive. But the real danger it seems to me is not that so much of what there is to watch on television is either mediocre or detrimental, but that the young people watching television are often unable to distinguish between which offerings are good and which are bad.

Kids watch television; that is a fact of American life. Helping them to become less passive and more critical viewers is a challenge to today's educators. But to assume that because teachers are older and wiser than their students, they will automatically be equipped to shape the viewing habits of their pupils is unreasonable. A good many teachers grew up in the age of television. They are as habituated to frequent television viewing as any other segment of the adult population.

However, the primary barrier to using television in a constructive manner in the classroom is lack of good advance information on programs. Teachers now must rely almost solely on commercial advertisements for information about specific programs. That information even when accurate, which by all means it often is not, does little more than alert the teachers to the time and channel for a particular presentation. Rarely are teachers provided with enough advance information about a program to enable them to advise students in a meaningful way about what programs may be worth watching. Neither do many teachers have the time or the resources to provide students with background and discussion material following a television presentation. Some teachers whose own education may have been in the physical or social sciences might not have the familiarity with the literary or historical content to deal with such things as theme, character development, or historical context. Yet if we are to begin helping students become critical viewers, we must help them separate fact from fiction or even history from literary license. A science teacher wishing to have his class watch a special on the life of Louis Pasteur might be advised to help his students understand that what they are watching is not real life or necessarily accurate history. If that teacher can help students understand that the Louis Pasteur they saw on TV the night before was a dramatic character and that the story was adapted to make it as exciting as possible, then perhaps there is hope that students will understand that Baretta is not a real policeman and that the wild chases, the exciting shoot-outs, and the glamorous women are not the accoutrements of crime.

The AFT will begin a new section with the next

issue in our professional journal, American Educator, which will provide guides for teachers on specific upcoming commercial and public television programs. The guides, prepared by our staff, will include plot summary, discussion of theme and characters, background information, as well as suggestions for classroom discussion, questions to be used by teachers, and a bibliography of additional materials.

The AFT is helping teachers use the technology of television in their classrooms by providing guides to network programs. But we will also carry on a regular basis in our journal articles about projects using instructional television in schools. Closed circuit cable TV, cassette tapes, and film are all becoming more prevalent in today's classrooms. The NCES/CPB study, the results of which were reported to you at a session this morning, found that one-third of elementary and secondary students view some sort of instructional television in their classes regularly. In talking to our teacher members about the subject of instructional television, we have corroborated the NCES/CPB findings that teachers are willing to use television when programs are available and appropriate to their needs.

Often, however, what is coming over the airwaves is either inappropriate or offered at the wrong time for teachers to make good use of programs. A suit pending in New York brought by three educational film producers against the Erie County Board of Cooperative Educational Services threatens to put a stop to the off-air taping of network shows for later classroom use.

Some school districts have made creative use of instructional television by purchasing their own equipment to tape and play back programs. In eastern Iowa, for instance, the College Community School District of Cedar Rapids operates a joint effort with Kirkwood Community College to write, produce, and tape their own shows for use in the classroom. Teachers there have been enthusiastic about the uses of TV. Our local AFT president has told us that the system is working well there. Perhaps that's because teachers are intimately ivolved in all aspects of the instructional TV. Teachers decide what curricula will be used; they write the scripts and produce the shows. And they are paid a fee for each task. When interviewed, most of the teachers we talked to said that the Iowa system is a helpmate in their teaching, not a competitor, and definitely not a foe.

But the AFT as a national organization can have little effect on the success or failure of such uses of special programming for instructional television. We are trying to provide our members, and whoever else wants it, with accurate, useful program information for nationally televised shows. We are also trying to provide our members with a greater understanding of the medium of television. There remain, however, great gaps in teacher training in the use of television in the classroom. Some of those gaps will have to be met in preservice and college education programs. The vast majority, however, should be in government financed in-service programs at the local level. But the emphasis must always be to work with teachers, not at cross purposes. Teachers can't be faced with a technology in which they've had no training, with no time or access to training, and with no consultation in what might be the most effective uses of the technology and be expected to receive that technology willingly. It is your responsibility to find ways to work with teachers and the organizations that represent them to institute training programs that will make use of this new and exciting technology.

Teacher Organization Attitudes: AECT

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The Association for Educational Communications and Technology recognizes that the twentieth century technology has caused the development of an increasingly rapid system for receiving, exchanging and distributing information. Most people rely on such media as television and radio to get information, news and current events along with entertainment. The pervasive influence of modern communications media on society makes it impossible to ignore their potential for improving instruction of students in all educational settings. Educational programs should respond to the needs and motivations of generations oriented to visual and auditory stimuli.

At the same time, AECT recognizes the emerging educational technology as embracing the notion of the systematic instructional process, as well as the employment of ever more sophisticated communications media for instruction. That emerging educational technology is described in detail is one of our Association's latest publications: Educational Technology: Definition and Glossary of Terms, Vol. I, 1977 (1).

The technical jargon used in education to refer to the communications media, or the products of our technology, are quite varied. Sometimes we call them instructional media, learning resources, instructional materials, and many other labels. For the purposes of this paper all of those terms may be used interchangeably, but none are equated with the term educational technology. Educational technology is a larger term which implies the employment of the various learning resources or communications media in a systematic way to cause instruction and learning to take place.

This paper advances three arguments concerning AECT's attitude toward teacher training and the use of educational technology.

The Teacher Must Be Competent To Employ Educational Technology

Our participation with other organizations and institutions to improve the training of teachers has been in the development of guidelines for the accreditation of teacher education under the general coordination and leadership of the National Council for the Accreditation of Teacher Education. AECT developed the first set of speciality guidelines for basic programs in teacher education (2) and published them in 1971. Subsequently, we developed guidelines for advanced programs in educational communications and technology in the same NCATE format (3) and published those in 1974. These were serious eforts which have been regarded as significant contributions in the teacher education field.

In addition, a past president of AECT led the development of a Task Force Report on Instructional Technology for the Associated Organizations for Teacher Education (4) which was published in 1971. That paper contains the following:

> A teacher education program which incorporates instructional technology to its fullest capabilities will reflect the following characteristics:
>
> 1) Experience in the interplay of all factors affecting the nature of given learning experiences, including emphasis upon helping learners to be unique as well as allowing each teacher trainee to be himself.
>
> 2) Experiences with all forms and arrangements for instruction, with recognition of balance between freedom to experiment and need for controls dictated by demands for organized learning and mass education.
>
> 3) Freedom of the training situation from unreasoned regimentation, and freedom of trainees and learners to explore new ways to achieve mutual goals.
>
> 4) Professionalism among teacher trainees in the applications of instructional technology to learning problems through emphasis upon:
>
> a. the use of instructional media as

inquiring, discovery, reporting modes, in addition to usual expository uses;

b. the collection of data about learner reactions to media and to the effectiveness of technological applications to learning problems;

c. the differentiation of roles for teachers, including diagnostician, programmer, evaluator, and manager.

5) Teacher education programs will become the combined product of agencies, public and private, encouraging the use and study of instructional technology in settings outside the school, expanding current uses of instructional personnel from local businesses and industries, and in using instructional facilities in industry settings.

6) Teacher trainees will examine the benefits of mediating agents to motivate interest among learners, in addition to ways for transmitting knowledge. Both teacher trainee and students will use electronic and mechanical devices for documenting and reporting phenomena and processing.

There Is Teacher Resistance To Changing Competencies In Educational Technology; But This Resistance Can Be Overcome

As the field of educational technology has enlarged its concepts, it has embraced several important notices. First, that we must apply a systematic approach to instruction and education; second, that a major component of this emerging field is the embracing and encouragement of change; and third that change must be managed, that innovations must be diffused and adopted. Resistance to innovation is not peculiar to teachers but it is an area which has been subjected to considerable study among the members of our educational specialty. In a summary of ways to reduce teacher resistance to innovation, the following rejection responses were enumerated:

1) rejection through ignorance - the innovation was unknown or its complexity led to a lack of understanding;

2) rejection through default - admitting a knowledge of the innovation without any interest in its use;

3) rejection by maintaining the status quo - innovation not accepted because it has not been used in the past;

4) rejection through societal mores - teacher feels society finds the innovation unacceptable and will not use it;

5) rejection through interpersonal relationships - colleagues do not use it, therefore, neither will I;

6) rejection through erroneous logic - the use of rational but unfounded reasons for the rejection of worthy innovations;

7) rejection through substitution - using one practice over another practice requiring the use of an innovation;

8) rejection through fulfillment - teacher is confident of the success of using his own methods, making innovation unnecessary; and,

9) rejection through experience - discussing with others the failure of some innovations.

His concluding statement is:

> Significant change, complexity, cost, lack of understanding and teacher involvement, and the innate conservatism of the educational establishment appear to be the major obstacles in the path of innovative adoption. Factors that tend to encourage acceptance are teacher participation in the planning process, transitional programs, ease of operation and reliability of equipment, administrative support, effective evaluation tools, and the ability of the innovation to accomplish predetermined educational objectives (5).

The Growth of Teacher Militancy Is Having A Significant Impact On the Emerging Educational Technology

Many of my colleagues believe that the trend today toward teacher militancy and the constantly increasing number of work related concerns which are included in contract negotiations may in fact work against the growth of a true educational technology. An interesting study of teacher organization leaders' attitudes toward aspects of instructional media provides some very interesting facts:

a) The majority of both NEA and AFT respondents considered instructional media to be relatively low on the priority lists of teachers.

b) The large majority of AFT and NEA leaders felt that instructional media would increase in relative importance in the very near future, and most leaders indicated that instructional media would increasingly be considered within the context of collective negotiations.

c) 96 percent of the NEA and 100 percent of the AFT leaders felt that instructional media should be included in future negotiations agreements.

d) Sixty-one percent of the NEA and 51 percent of the AFT representatives interviewed believed that they were moderately well-informed in the area of instructional media relative to other groups of educators. The greatest proportion of those interviewed obtained information on instructional media primarly from adver-

tisements and brochures by commercial groups, or through personal experiences with media in previous class-room teaching ... less than 10 percent indicated college coursework as a meaningful information source on media.

e) More than 71 percent of the NEA and 86 percent of the AFT leaders believed that teachers are relatively uninformed in the area of instruction media. Most respondents (94 percent NEA and 93 percent AFT) considered that their organizations had a definite responsibility to inform teachers about instructional media, either through workshops or in publications by the organization. The greatest need was seen for information on the most recent forms of media in education since the new forms are less familiar to the teacher.

f) Instructional media, per se, were not regarded by the majority of AFT and NEA leaders as "threatening" to teachers. However, many leaders were concerned about teacher voice in decision making and the possible loss of classroom autonomy for the teacher if media were to be used extensively in the schools.

g) A related problem perceived by some respondents was the "fear of replacement" by such systems as computers, televised instruction, and programmed instruction courses, although these were regarded more as potential rather than real and immediate sources of "fear" to teachers.

h) lack of familiarity was considered to be an important factor which could contribute to teacher anxieties in the area of instructional media, and a large proportion of leaders felt that instruction on media should represent an integral part of teacher education programs and inservice programs in the schools (6).

In summary, as the professional educational organization that advocates the growth of a true educational technology, we are ambivalent about teacher training. In the first place, we feel that a carefully trained educational specialty in media and technology is badly needed in American education. On the other hand, we have long advocated increased competence in media and technology on the part of teachers at all levels in the educational enterprise.

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Special User Considerations—The American Indian Community

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This subject has special meaning for the American Indian community. In order to fully appreciate the significance of the subject, certain perspectives should be drawn which describe the Indian community today, among these are the following:

- An emerging community, based on a population growth greater than national or regional rates;
- Functional self-determination and local control based on specific legislation, especially PL-638, "Indian Self-Determination and Education Assistance Act" (1975).
- Accumulative effects of human and material resource development from nearly a decade of federal programs such as OEO and ESEA title activities which now form a base for planning and development of education programs under PL93-638 and other programs particular to Indian community.
- Increasing number of community-controlled tribal schools (elementary to college level).
- Increased opportunity for more integrated education program strategies in support of comprehensive community development activity.
- Phenomenon of comprehensive community planning which deals with culture, economic development, educational services-health needs on an organic basis.
- Greater need for long term, career development programs and short term, adult level retraining programs due to increasing economic, tribal program development activity.

NEEDS

These descriptors of the American Indian people suggest a range of needs which revolve about the issue of community control as a key element in designing and implementing educational programs. Further, the design of program must meet special objectives of education including the preservation of cultural institutions while meeting the demands of a rapidly changing social environment. The community must be able to make important decisions about the nature of education programs from a multitude of options that includes the community designed alternative.

Thus, education, as we view it, deeply involves a community-based process and deals with certain specific concerns when considering the use of educational technology:

1. Will technology enhance the local community's ability to make better decisions in a program development which serves specific needs.
2. Will technology help the community better understand how learning occurs, thus clarifying relationships between methodology of instruction (pedagogy and delivery systems) and quality of program content and effective mastery of skills?

Unless these questions are addressed, educational technology and its capabilities will continue to be misunderstood and the following observation will probably continue to apply:

> A proliferation of audio-visual equipment found its way into our schools. The shotgun introduction of visual aids and educational technology, however, did not alter the normal curve distribution. One-third failed in their studies. The introduction of each new teaching method or form of educational technology was heralded by its proponents as "the" solution. (Hill and Setz, 1977.)

Areas of Consideration

Research: An extensive amount and range of research

literature exists on relationships of culture, language, personality development, perception and the learning processes. Studies in creativity and aesthetic education indicate traditional approaches to learning and instruction have been limited to a small segment of the total functional areas by which children and adults can learn. Furthermore, the importance of learning in the period from birth to six years of age suggests even greater attention be given to cultural factors at the formative levels of instruction.

These considerations of the learning process have obvious importance when using educational technology and in the training of a broadly defined group of users, including but not restricted to, professional educators. Considerations of the learning process are especially critical in the field of Indian education. With the great potential of local control as outlined in the provisions of PL 93-638, the Indian community is faced with serious questions of developing an integrated educational sysem that fully utilizes the resources of community, culture, family and language in a comprehensive program of instruction. How technology facilitates or inhibits that process of resource utilization in program of instruction is our concern.

Hardware capability: As with others, the Indian community is acquainted with the typical array of technological hardware in classroom utilization. However, in all cases the extent to which these systems are effectively employed in the instructional activity depends on the understanding and analysis by the instruction of the limitations of technology to: (a) perform certain functions which the teacher might normally, perhaps more appropriately, do; or, (b) perform functions not possible by the teacher, and perhaps, more appropriate to the technology and therefore, more beneficial to the learner. In this regard, hardware as a means of instruction raises the basic and critical issue of how well training for the user defines the technical nature and limitations of any technology. The technical aspects of understanding technology help determine how a teacher or other user can conceptualize the technology as an alternative system for conceptual and skills development among students (e.g., computer graphics as a device for understanding emic-etic dimensions of language and culture perception or holography as a means of learning time-space-personal relationships).

Software: Without substantive instructional material content, it matters little what the level of capability or the availability is of the technology. For the Indian community, involving an extensive range of potential users, a very complex situation exists. Use of native languages, cultural references and contexts of program development along with other factors and elements specific to local tribal concerns are critical to programming content and method of presentation. To a great extent, the development of pertinent materials has been dealt with by the Indian community itself. Through funding, ranging from ESEA title funds to public and private foundation monies, a considerable store of human and material resources has resulted. The exact quality and amount of such materials and resources, whether measured by category of curriculum, tribe or other designations, awaits more extensive examination and evaluation. Also, how well these materials will adapt to the many types of delivery systems offered in technology also requires more review and analysis.

These discussions raise some basic issues for the Indian community and those in the field of Indian education:

First, does training of the user, professional or others, in the employment of educational technology assure sound understanding of the relationships between the learning process and culture, creativity, perception and personality development. The intriguing potential suggested by Hall (1977) and others on holographic theories relating to the function of memory, learning and cultural contexts of education, at least suggest an extensive system of learning stimuli and responses which require a more systematic and comprehensive approach to instruction. In this regard, technology could better serve the instructor and learner by providing greater access to a multisensory-multidisciplinary approach in instructional techniques. That access is obviously determined by the content of training.

Second, a major inventory and assessment of scholarly findings on learning particularly in the fields of educational psychology, language and culture should be completed and integrated in a process by which the research can be applied in a planning and implementation of programs by a wide audience of users. Rothman (1974) provides a model for such a process which has important implications for educational technology in formal and non-formal applications.

Training may therefore require the incorporation of more extensive study of the psychology of learning, anthropological research in cultural perception, all with specific course correlation with theories of technology as an educational delivery, not just communication or data, system.

Serious gaps seem to continue in understanding the manner in which learning fully takes place. From the view of Indian education, the need to understand the function of culture in planning total community education becomes critical. Language, social behavior, subleties of non-verbal but high level experiential modes of instructions and learning that Hall, Calvin Taylor and others have discussed for years becomes important in understanding the place of technology in relation to the opportunites that Indian people have in locally determined education program development.

To the extent that technology can possibly provide simultaneous sensory approaches in a learning-instructional strategy, there is great opportunity to broaden the range of education strategy. For those engaged in Indian education, the challenge and great opportunity is at hand: how to utilize the vast and relatively untapped human and material resources unique to the Indian community in a locally defined and controlled education program.

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Administrator Attitudes and Practices

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From one who has been laboring in the electronic vineyards for many years, a loud "bravo" is expressed to those responsible for this timely conference devoted to the discussion of a pressing need. Perceptive diagnosticians have recognized a serious weakness that requires intelligent and continuous treatment.

On addressing the topic, however, it is suggested that "teacher training" in the title be interpreted in a broader sense, as "educator training." My point is that effective utilization of educational technology, in fact, whether it is used at all, requires acceptance, support, understanding and special skills among all involved--including superintendents, principals, supervisors, teachers, as well as broadcasters, parents, and yes, students. Therefore, programs of preparation and in-service education should be planned for all--for each has a role in the success of the venture.

This conference represents the promise of a giant step forward finding solutions to an acute problem that has plagued educational radio and TV from their beginnings. Unfortunately, utilization of software has not kept pace with the dramatic progress made in the technical state of the art.

For instance, during the TV education study conducted by the Corporation for Public Broadcasting during 1974, members of the elementary and secondary education task force visited a number of cities of varying sizes, types and locations to meet with teachers, administrators, curriculum specialists, broadcasters, and parents and students. In response to our questions on the important ingredients for success, staff development and administrative support were high on the list.

Recently, a director of instructional services in a large city school system made that point that not only is in-service education needed; but it must be a continuous service. She cited situations where principals and teachers who had received good preparation and in-service experiences conducted excellent applications and uses of educational technology. However, she lamented, when the excellent teachers were promoted and moved on, and the principals were transferred, the successors with less understanding of technology, permitted the program to become a minimal appendage.

The current School ITV Study by the Corporation for Public Broadcasting and the National Center for Education Statistics confirms the above when it reports that teachers, principals and superintendents who have had training in the uses of educational technology have more positive attitudes toward it. This is not an unexpected finding; it underlines the need on which this conferenece is focused.

A number of other findings in the ITV study raise some interesting questions that in my opinion have implications for our deliberations here. In response to the question whether school district encouragement or lack of it (and I interpret school district to mean administrators) aids or hinders the use of ITV, about 38% were positive; about 33% were negative; and about 48% said that neither encouragement or lack of it made any difference. I wonder about that larger number. Is there a lack of understanding and awareness? Is there a breakdown of communication between administrators and teachers? Or is the "no difference" response due to apathy?

In another response, 50% of the teachers and administrators expressed positive attitudes toward ITV; 10% were negative; 40% had no opinion. I'd like to know whether the 40% with no opinion had any previous preparation in this field. It is probably a safe bet that they did not.

A report on that study was given at the national convention of the American Association of School Administrators in Atlanta, in February. There is a significant message in that study for administrators, and for all of us.

One of the problems facing administrators in developing successful uses of educational technology stems from budgetary constraints--the old refrain. As a superintendent surveys his budget, he is inclined to make necessary cuts where the

losses are least visible. Staff development, therefore, is vulnerable. There is a public outcry if kindergartens are threatened, or varsity sports. If there are in-service programs, they are likely to be focused on areas other than the uses of technology, particularly when the budget already includes funds to the station for production, for video recordings, and TV receivers. The rationale may well be that this department has received its share. However, I don't want to paint a gloomy picture. There are some excellent examples around the country of productive uses of technology in the teaching-learning process. San Diego County Schools combines open circuit, cable TV, closed circuit systems, and the superintendent is on the Board of the Public Service Satellite Consortium. The operation is an integral part of the education process. Norfolk, Virginia, Fort Lauderdale, Florida, also conduct successful programs, and there are others.

In Fort Lauderdale, four channels are used on Instructional Television Fixed Services (ITFS), available from the 28 channels reserved by the FCC on the 2800 MHz band of the spectrum, for instruction.

Because of pressures from commercial and other interests for the channels, the FCC, from time to time, asks the educational community about its future uses of ITFS channels, minimally used at present. In order to answer the FCC, AASA conducted a survey three years ago. Many members expressed interest in ITFS, but lacked the financial resources for the necessary installations.

Consequently, AASA has taken a position favoring liberalization of the Facilities Act, to permit allocation of funds for non-broadcast technologies, including ITFS, to school districts and educational institutions as well as stations.

On the national scene there are some exciting developments that deserve attention and support. One of the most significant administrator initiatives in providing education through technology is that of the Council of Chief State School Officers with the Agency for Instructional TV (AIT). Edwin Cohen, who heads AIT, has obtained the support of the state superintendents of public instruction in funding series of programs that they and their constituencies consider important in fulfulling unmet needs of students. State departments of education now contribute funds to program production, also supported by federal funds, and grants from CPB and corporations. Tapes are made available to the participating states for use in any way they see fit, without copyright restrictions. A new series, now is the planning stage, may well result in much greater support of education technology in schools throughout the country. AIT, with local groups of administrators, principals, curriculum specialists and teachers, is putting together a series on Essential Learning Skills, related to the "back to basics" thrust. Nancy Rambusch, of the Caedman School in New York, writes about the project in the January issue of the American School Board Journal. She says: "Anyone who ignores instructional television on the way back to basics suffers from terminal nostalgia. Television is the medium of our time, and it is a superb teaching tool, when used appropriately." Again, there's the key. Although the AIT ser are well produced, and are widely accepted, preparation of teachers to use the programs, exce the provision of printed materials, usually is left to local initiative.

Another message comes to us from the president of the National Council of Teachers of English. A UPI story quoted Margery Farmer as saying: "Among English Teachers we don't get the reaction we used to receive so often--that television is the enemy of instruction. But teachers haven't been educated in how to use television as a resource, and many are uneasy with it becuase it was not within the scope of their training."

The evidence of need is abundant. The question is what can be done. Here are several recommendations:

1. <u>In-Service Education to Meet Immediate Needs</u>

It is suggested that a national program for in-service education, funded by grants to school districts and consortia of educational institutions be intiated, to include teachers, administrators and other involved in integrating technology into the teaching-learning process. Such a national effort would focus attention on the need, the values and the importance of preparing educators to utilize present and developing technologies for the enhancement of education. Such workshops, seminars, etc. should include more than an aquaintance with hardware, although it is important for teachers to know how to adjust receivers, and administrators must realize that maintenance is a part of the investment. Although experiences with studio hardware are exciting and attention-getting, they are only part of the package. Included should be demonstrations of the actual utilization of the programs--the artistry of utilization. For this is where the real "pay-off" in learning takes place. Many workshops deal mainly with production, program planning, curriculum development--and these are important. But what happens at the other end--the receiving end--is the peak of the endeavor. When administrators, teachers, parents and broadcasters see a skillful utilization by a fine teacher--the meaning and value of the entire process comes into sharp focus. Administrators see the justification for the investment. And those who observe such a demonstration have ready answers for critics who label TV learning as "passive." In-service education that omits demonstrations of usage omits what utilization is all about--the core of the learning process.

2. <u>Program to Meet Future Heads</u>

It is suggested that the appropriate national agencies fund programs in colleges of teacher and administrator education, to provide them with an understanding of the potential of the variety of educational technology available, and how to apply and use it effectively. Since many administrators begin their careers as teachers, this program through future years, will produce a generation of educators who have some knowledge of the field.

3. In-Service Seminars for Adminstration

The American Association of School Administrators, through its academy of School Executives conducts a year-round series of seminars on topics of interest to educators. In perusing the topics for the present and immediate past, they relate to pressing problems--the copyright law, interpretation of the new regulations regarding education of the handicapped; discipline; managing strikes, etc. However, with the emerging new technologies, and the emphasis on basics, now is the time for the appropriate agency to approach AASA and cooperatively schedule one or two seminars on the uses of educational technology. Administrators are aware of new developments in technology, but only a few have been able to keep themselves informed. I know that Paul Salmon, Executive Director of AASA would welcome an opportunity to plan such seminars.

4. Seminars by Satellite

It is suggested that a seminar by satellite be planned and implemented cooperatively by the appropriate national agency and AASA, focusing on the availabilities, uses, values, problems of the emerging technologies. Presentations by experts, and demonstrations of utilization could be made at one origination point, and received by groups of administrating principals and teachers around the country, at designated receiving stations. Two-way audio would permit discussions. AASA, a member of the Public Service Satellite Consortium would cooperate in such a project. What better way to learn about technology? Cost of time and travel saved would help offset the cost of transmission.

An important concomitant of the above suggestions is that national attention will be focused on the opportunities and availabilities that exist; on the inherent values that have been but partially developed; on the importance of educator preparation and in-service education as a crucial ingredient of the whole.

There is a potential in this conference for a follow-up that will have significant impact on the future development and progress of the contributions of technology to education. And now is the time. There is an escalation of interest among government and education in all facets of public broadcasting. The President's message to Congress; the re-writing of the Communications Act; the studies by Carnegie Commission II--these suggest that there is a strategic basis for a national thrust to alleviate the problem we are discussing here. This conference is the beginning of such a thrust. The sponsoring agencies have opened the door to continuing action to bring together the educational community and government to capitalize on the potential of technology for the enhancement of education.

Staff Development and Educational Technology

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American Education during the decade of the 1980's will be characterized by a declining school population and a stable professional staff. The influx of new teachers and the mobility of the teaching staff of the 1960s and 1970s is rapidly becoming a phenomenon of the past. Professional staff in educational institutions will be more likely to receive their own education locally. Mandated federal laws require that local shchool districts meet the needs of handicapped, minority, gifted and in effect all children on an individual basis. The basic structure of the school system is shifting from a content based 'lock step' all children learn the same curriculum to a differentiated curriculum which meets the appropriate needs of individual learners. Ironically, at the same time that those who have been excluded from the schools are given entry into the schools, there is a back to basics movement. The schools will be compelled to meet both trends; education for all children and a basic standards of achievement in reading, writing, and computation by providing education which is appropriate to the individual needs of each learner. This cannot be accomplished without the adaptation and adoption of applied learning technology.

The public will no longer tolerate failure, exclusion, dropout and non-appropriate education rates among 30 to 40 percent of the school aged population. These factors indicate a need for extensive and continuous staff development if American Education is to remain viable as a major knowledge source within our society.

In the 1980s scarce revenues within the educational system will be shifted to meet the most pressing needs on an operational level in school districts. Those activities which can offer efficient and demonstrable advantages in improving the learning process will become the budget items most likely to be funded. The cost benefits of technology to deliver staff development will be the most accountable way to achieve staff development. Staff development through learning resources will reduce time and travel costs of individual staff members.

Traditional staff development in most schools can be described as passive 'in service days' with little or no opportunity for interactive dialogues between the presenters and the consumers. Much of the staff development in education has been conducted through formats similar to traditional university courses. With a stable education staff, these traditional methods are no longer acceptable. While the enrollment and staff of the schools will remain relatively stable the characteristics of the students within the system will not stand still. The most obvious example of this is the acceptance of the handicapped learner's rights to be a part of the system. Schools can no longer reject minorities, handicapped people, nor those who for one reason or another do not function adequately within traditional concepts.

If the educational system is to retain its central position in American life then it needs to adjust to the new demands placed upon it. To do this, it will need to renew its administrative and professional staffs from within. Progress towards a new concept of school and its role in society indicates that we are a learning society which values continuing education on a life long bases. To be an enlightened population in a modern technocracy the learner and teacher must become literate in the instruments of the new technology. Ten years ago in the NBC special the Learning Process Harold Howe noted that we use technology in education as an after thought. It's as if we were to train teachers without letting them read books until their last college course and then had a single course on the value of books in the educational process. If we followed that pattern, books would probably be used as about as effectively as technology is currently used in our schools.

The technology we are most interested in from a learning viewpoint is the technology of information. With the book and the printing press, people were able to store and transfer knowledge across time and space. If we knew the input system we could retrieve the stored information at our own pace, based upon our own demand. Such technology, of course, revolutionized the education systems of that day. It gave birth to schools as we know them and eventually to universal education. Today

electronic storage of information has magnified the information base within our society many times. It is likely that electronic information storage will radicalize the current educational system just as much as movable type did in the 1500s. Just as books did not eliminate master teachers, electronic storage of information will not eliminate the teacher nor the school. However, it will change both the teacher and the school far beyond our present day concept. Public schools may have had their greatest day between 1925 and 1965. During that time they were the major, if not the only source of information. Today schools compete with a number of easily accessible alternative information sources; television, radio, telephones, advertisement, and organizations. Broadcast radio and television have the ability to reach large populations with specific information in a cost efficient manner. The telephone system can access individuals or groups of individuals on an as needed basis. It is the blending of print and electronic storage of information into an accessible educational unit that is the current challenge to the educator.

Staff development programs must embrace technology as a major tool so that those who learn through technology will be able to use it to guide the learning of their students. In the Appalachian region using the ATS-6 satellite in the 1977-78 school year there will be more than 1,200 regular teachers and administrators who will participate in a multimedia program designed to improve their teaching of handicapped children in public school settings. This project uses a wide range of passive and interactive technology techniques. Groups of professional consultants answer questions of teachers throughout the Appalachian region via ATS-6. Byproducts of this project are recycled into a stage of the program which includes video tapes, printed manuals, audio tapes and other hands on materials which become a part of the learners reference sources. Additional experiments in training on an inservice basis in Williamsburg, Virginia use Instructional Television Fixed Systems (ITFS) to enable the learner and teacher to talk back and forth through two-way video systems which allow the teacher to share problems with other professionals. For example, the camera can either tape or provide live coverage of a teacher's specific problem within the classroom so that the teachers can have an individual case staffing by experts. A series of video cassettes at the University of Michigan uses a special re-enactments of classroom problems of emotionally disturbed youngsters and describes how to control such behavior in school situations. These re-enactments (with child actors) are staffed by different disciplines including medical and psychiatric personnel. The staffing sequences are separate from the problem sequences so that teachers can react to the problems and compare their views to that of a variety of different experts.

Sophisticated teleconferences have been available for staff development for a number of years, however little real advantage has been taken of this common telecommunications system. A most effective staff development conferences was held at Madison, Wisconsin by the Rehabilitation Services Administration in 1977. This conference demonstrated the use of a number of technologies directed toward a single goal, rehabilitation. Participation by the Secretary of HEW's Office via conference telephone calls allowed the assembled professionals in Madison to question the Assistant Secretary and other governmental officials in Washington, D.C. on policy issues. There was participation by severely physically handicapped persons who were not in physical attendance at the conference, but connected by telephone. The use of television via satellites allowed professionals in Madison to staff specific clients at a center in Virginia through a one way video transmission with voice back to the Virginia site.

What does the future hold for technology and staff development for special populations? With the development of micro-computers, video-tapes recorders and video-discs the educator has a new group of technologies that can be adapted to learning. A combination of micro-computers and video-discs allows us the possibility of a new level of interactive and inquiry learning experiences that is affordable. The key to whether these new tools will be used wisely in the educational systems of America is how well we use them in staff development. The critical link in the use of technology is not a cost factor, not even a system design factor, but in working with teachers so that they adapt and adopt technology in their day to day management of the learning process. If we do not use the effective mixes of information technologies that are available within society, then the schools will decline in their role as a learning institution.

The single most important ingredient in the 200 year American Experiment has been its ability to use its schools to make knowledge and information available to all of its citizens. Our future development as a nation depends upon how efficiently we make electronic knowledge and information available on a universal life time basis to all citizens.

Access to inquiry, interactive communication systems is essential to the American way of life and the further development of our society.

Logistics and Content—Including Hardware, Compatibility, Distribution Systems and Software: Some Thoughts for Further Consideration

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Assuming that computers are a representative technology, I will restrict my remarks to the use of computers in education and present a few thoughts on their applications in the administrative and instructional areas. In this way, I hope I can give some insight into the more general topic, and illustrate some of the problems teachers and adminstrators face in employing them for educational purposes.

This is a particularly appropriate technology to consider at a meeting of the Federal Interagency Committee on Education (FICE) because of the large, although not fully consistent interest of the Federal government in its use in education. A few years ago, I estimate that the U.S. Office of Education alone in the six-year period, 1965-1971, spent over $161 million in the support of over 500 computer projects.

To date, literally tens of thousands of computer programs have been written to perform administrative functions. A few years ago, for example, it was estimated that there were 200-300 data processing installations in the State of California, and that for the schools in the city of Sacramento alone over 500 separate programs were written for one type of computer. The scope of the proliferation of programs is obvious, as is the problem confronting a teacher who moves one location to another, where the computer programs, capabilities and formats for the printouts are different in each setting.

Yet, with a few prominent exceptions, in spite of the large number of programs that have been and are continuing to be developed, and the resulting duplication of effort, there has been little exchange of programs, particularly at the elementary and secondary school levels. While this may be attributed to several factors, a primary one is that no mechanism presently is available for exchanging programs or even for an installation to learn about programs that already exist.

The first solution to the problem that might come to mind is the establishment of a central clearinghouse which can serve a soft-ware databook for computer programs. Such a clearinghouse could identify, collect, store and catalog programs, periodically disseminate information about what exists, and provide copies of programs on request. It would operate in a manner similar to information centers that now exist for print materials. There are several reasons, however, why this type of dissemination mechanism would not work for computer programs.

First, documentation on many programs is poor. Flow charts often are not accurate, and for many programs there is no complete narrative description of how the program works. Second, although this seems to be becoming less of a problem, many programs have been written in computer languages or dialects that are usable only with specific hardware. To modify these programs to run on other equipment, even of the same manufacture, could be a major task comparable to writing a totally new program.

Third, if a computer center obtained an existing program and requested programming assistance from the originator in order to adapt it to its system, that assistance probably could not be obtained. A major portion of the programming staffs of many educational data processing centers, particularly in the smaller school districts, are made up of temporary and part-time personnel. Therefore, the authors of a given program may no longer be with the center and, further, the programming staff on-hand is not in a position to consult with another installation that could be halfway accross the country. Hence, most existing programs do not appear to be suitable for distribution.

An alternative to a general clearinghouse that does appear to be viable is to establish a specialized, highly selective service center for computer programs. This center would identify and collect only those existing computer programs which appear to be most applicable for widespread use. If necessary, it would modify the programs to make them suitable for a class of machines or computer configurations, test the programs to insure that they do perform the functions for which they were

designed, and complete the documentation for use by system programmers and potential users. The center would catalog information about the programs and disseminate it to appropriate audiences. Then, for a nominal service and handling charge, the center would distribute copies of any program to the requestor. Thus, instead of being a clearinghouse to collect and disseminate large quantities of materials, the center would provide a specialized, in-depth service by dealing with a limited number of highly-selected, tested and fully documented programs.

If the requestor required consulting assistance in adapting the program to run on his or her machine, this might be done on a limited basis by the center or could be provided by numerous commercial computer vendors, since adequate program documentation would exist. This latter approach would be a separate arrangement between the requestor and the vendor, and would not involve the center.

Although not structured to exactly this model, the National Center for Higher Education Management Systems, or NCHEMS, has done a very credible job in providing needed technical assistance and computer-based services in the administration and data management areas to be institutions of higher education. A similar organization is needed to provide the same types of services at the elementary and secondary school level throughout the nation.

A second topic I will discuss briefly is computer-assisted instruction. This is an area that has been in development for twenty years. It came about with a great deal of promise and was greeted with much enthusiasm. A large amount of time, money and effort has been spent in developing CAI, yet it still has not met the initial expectations for it. Recent advances, such as have occurred in the University of Illinois' PLATO system and in Mitre's TIOCIT, as well as improvements in languages such as Coursewriter and PLANIT, have once again brightened the hope that CAI will be widely used in the future. However, after two decades, the success of CAI as measured by its effectiveness and cost has been demonstrated only in limited applications, such as drill-and-practice. Our limited knowledge of how people learn and the difficulty of programming a computer to engage a human in conversation-like dialog has restricted most successful uses of CAI to subjects that are highly structured, such as mathematics, and to dialogs that are unambiguous and not heavily laden with implied meanings.

For some of the more interesting and complex CAI programs, such as those used on the PLATO system, a great deal of course development time is necessary. As late as the early 1970's it was projected that teachers would soon be able to prepare a one-hour lesson for a class in one to two hours. It is estimated, however, that the preparation time currently is closer to 300 to 500 hours for each hour of CAI lesson time. To overcome this difficulty, several things seem to be necessary. Flexible, general-purpose, easy-to-use CAI author languages are needed so that teachers can concentrate on the instructional task and not the computer programming. Automatic translations are needed to convert CAI programs written in one language to another, so that the same program does not have to be written more than once. In addition, a central source of CAI instructional programs that can be easily accessed by teachers may be needed. Perhaps, an instructional program databank, similar to the present Nuclear Engineering Data Bank at the Argonne National Laboratories, is needed. Adequate reward structures also must be available for course authors, and difficulties with copyrights and royalties must be overcome.

Even after the above problems have been solved, CAI still must be accepted into the schools before it can have an impact on education. If CAI is to become wide-spread, changes in teacher attitudes must occur. There are the problems of faculty conservatism (for lack of a better all-encompassing term) and traditional reliance on textbooks and lectures as the principal method of teaching. Large-scale teacher training programs may be required to acquaint teachers with CAI systems and with how to use them. These programs must familiarize teachers with the devices to remove the threatening aspects of the unknown and, more important to show teachers how to incorporate CAI into their teaching so that they are masters of their profession and are not dominated by the situation.

While none of the above problems is insurmountable, efforts are required to resolve them. This indicates that while CAI holds a fascinating promise for the future, we still are in the present.

These two examples are illustrative of the broader problems facing systems developers, manufacturers, teachers and users of educational technology generally. Computer languages and various types of equipment must be standardized. Course material must be widely available, and that which is hardware-dependent for its delivery should be in agreed-upon formats. Teachers must be trained, not only to use the hardware, but more importantly how to structure their teaching approaches to take advantage of the opportunities technology offers.

A needed role, that perhaps FICE could undertake, is to serve as a catalyst to draw together the interests of the Federal Government, commercial organizations, and public and private groups and to provide a forum and common meeting ground so that these groups can discuss and work on problems of common concern that affect the nation's learners.

Appendix A
Report of the FICE/SET Task Force on Teacher Training

The Task Force on Teacher Training in the Use of Educational Technology was formed by the Educational Technology Subcommittee of the Federal Interagency Committee on Education (FICE) to explore how and to what extent teachers are using technology in their teaching, and how and to what extent teachers are being trained to use educational technology. Specifically, four substantive questions have been raised by Dr. Virginia Y. Trotter, Assistant Secretary for Education and Chairperson of the Federal Interagency Committee on Education:

1. To what extent are teachers and administrators prepared by training institutions in use of educational technology and particularly instructional television and radio, use of computer in instruction, management of instruction, etc.?

2. To what extent do the training institutions utilize educational technology in preparation of teachers and administrators?

3. What is the nature and extent of in-service training?

4. To what extent do states require evidence of preparation in educational technology as part of their certification requirements?

ABSTRACT:

The Educational Technology Subcommittee, Federal Interagency Committe on Education (FICE) has approved plans for a working conference designed to encourage more effective use of educational technology in the schools.

The conference will have three principal objectives: (1) to provide a forum where expert speaker-consultants will for the first time bring together the results of their original research, not available in the library, and respond to a series of substantive questions; (2) to solicit recommendations from the experts for solutions to problems identified during the conference; and (3) to publish a report that will be made available to federal, state, and local officials; school administrators; and others sharing a concern about the issues, as encouragement and guide for their policy planning.

The accomplishment of these objectives should make a unique contribution to American education.

These questions have provided the primary investigative mission for this Task Force, and in the course of carrying out that mission it received from the National Advisory Council on Education Professions Development a limited historical overview.

While individual members of the Task Force are personally aware of isolated efforts that have addressed or are underway to address these questions, there is little aggregate data available to provide a comprehensive nationwide or even regional picture of the situation. Yet authoritative answers are needed at the local, state, and federal levels in order to provide a base for policy recommendations.

In an effort to provide a forum for the discussion of these issues and to solicit recommendations from experts in the field for solutions to the problems out of which Dr. Trotter's questions arose, the FICE Subcommittee on Educational Technology has approved plans for conducting a conference during which expert speaker-consultants will present and discuss previously prepared papers and respond to the following questions:

1. How can educational technology best be employed to improve learning opportunities for students?

2. What teacher training is needed to maximize the effective use of educational technology?

3. What are the major problems inhibiting effective teacher training in the use of educational technology?

4. What are effective solutions for the problems identified in 3, above?

5. What is the role of government (federal, state, and local) in arriving at solutions to these problems?

The speaker-consultants will be selected from professionals whose expertise embodies priniciples having a broad application in education. Each speaker-consultant will be asked to prepare a professional position paper* addressing these topical questions, with appropriate references to assure that the contents are authoritative. At the same time, in order to maintain a sharp focus on the problems at issue, each speaker-consultant will be asked to emphasize (though not to limit his discussion to) a specialized area of his expertise. Each paper will be circulated to all conference participants for study prior to the meeting. At the two-day conference each expert participant will be allotted a specified period of time to read, discuss, and respond to questions concerning his position paper and point of view. All participants are expected to take part in the question-and-answer sessions to the end that final recommendations will be based on a broad understanding of the problems under discussion.

The conference will be conducted as an intensive working session. Therefore, the number of active participants will be limited to not more than ten expert speaker-consultants, a moderator, members of the FICE Educational Technology Subcommittee, representatives of sponsoring agencies, other concerned government officials, and a conference monitor, to a total of not more than forty. The conference monitor will be commissioned to record the proceedings and produce a final report, summarizing the information in a form suitable for publication.

The Task Force believes the conference will be unique in several respects. It is designed to provide a forum where expert speaker-consultants of varied experience in the field of educational technology can for the first time bring together the results of their original research not available in the library. It is designed to provide the opportunity for these experts to work cooperatively with the other participants to devise a set of recommendations for solutions to problems of wide concern. And it will produce a report, to include the recommendations of the participants, that will be made available to federal, state, and local officials; school administrators; and other sharing a concern about the issues, as encouragement and guide for their policy planning.

There is much evidence that many schools and universities throughout the country have invested heavily in the equipment of educational technology but are not making effective use of it. We expect the conference to uncover the reasons for this situation and to discover ways of exposing teachers and administrators to the wide range of educational technology methods available to them. To give them, in the words of our original report, an expanded view of the art so that the institutions and their students may realize the full potential of their human and technological capabilities. To do so will be to make a significant contribution to American education.

FICE/ETS Task Force on Teacher Training in Use of Educational Technology

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M. Gene Bennett, Co-Chairperson
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June 24, 1976

* Conforming to a common style and format that will be outlined in the initial invitation.

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Appendix C
Panel of Experts

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(FICE)

Subcommittee on Educational Technology
(SET)

Conference on

Teacher Training in the Use of Educational Technology

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Mary F. Berry, Chair
Assistant Secretary for Education
Department of Health, Education and Welfare

Members

* Commissioner of Education
* Director, National Institute of Education
* Department of Agriculture
* Department of Defense
* Department of Energy
* Department of Labor
* Department of State
* National Aeronautics and Space Administration
* National Science Foundation
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Administration on Aging
Alcohol, Drug Abuse, and Mental Health Administration
Civil Service Commission
Community Services Administration
Department of Commerce
Department of Housing and Urban Development
Department of the Interior
Department of Justice
Environmental Protection Agency
Federal Communication Commission
National Endowment for the Arts
National Endowment for the Humanities
National Institutes of Health
Office of the Assistant Secretary for Health, HEW
Office of Child Development
Small Business Administration
Tennessee Valley Authority
Veterans Administration

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* Office of Management and Budget
* Council of Economic Advisors
Council on Environmental Quality
National Academy of Sciences
Smithsonian Institution

Bernard Michael
Executive DIrector
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* Agencies named in Executive Order 11761

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